OMB No. 2040-0042 Approval Expires 12/31/2018

EPA

United States Environmental Protection Agency
Washington, DC 20460

Completion Form For Injection Wells

Administrative Information

1. Permittee: Florence Copper Inc.

Address *(Permanent Mailing Address) (Street, City, and ZIP Code)*: 1575 W Hunt Hwy, Florence, AZ 85132

2. Operator: Florence Copper Inc.

Address *(Street, City, State and ZIP Code)*: 1575 W Hunt Hwy, Florence, AZ 85132

3. Facility Name: Florence Copper Inc.

Telephone Number: (520) 374-3984

Address *(Street, City, State and ZIP Code)*: 1575 W Hunt Hwy, Florence, AZ 85132

4. Surface Location Description of Injection Well(s)

State: Arizona

County: Pinal

Surface Location Description

SE 1/4 of SW 1/4 of NE 1/4 of SW 1/4 of Section 28 Township 4S Range 9E

Locate well in two directions from nearest lines of quarter section and drilling unit

Surface Location 1080 ft. frm (N/S) N Line of quarter section
and 900 ft. from (E/W) E Line of quarter section.

Well Activity

- [ ] Class I
- [ ] Class II
  - [ ] Brine Disposal
  - [ ] Enhanced Recovery
  - [ ] Hydrocarbon Storage
- [x] Class III
- [ ] Other

Well Status

- [x] Operating
- [ ] Modification/Conversion
- [ ] Proposed

Type of Permit

- [ ] Individual
- [x] Area : Number of Wells 33

Lease Number: NA

Well Number: R-03

Submit with this Completion Form the attachments listed in Attachments for Completion Form.

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment (Ref. 40 CFR 144.32)

Name and Official Title *(Please type or print)*	Signature	Date Signed
Ian Ream, Senior Hydrogeologist		9-12-2018

Attachments to be submitted with the Completion report:

I. Geologic Information

1. Lithology and Stratigraphy

A. Provide a geologic description of the rock units penetrated by name, age, depth, thickness, and lithology of each rock unit penetrated.

B. Provide a description of the injection unit.

(1) Name
(2) Depth (drilled)
(3) Thickness
(4) Formation fluid pressure
(5) Age of unit
(6) Porosity (avg.)
(7) Permeability
(8) Bottom hole temperature
(9) Lithology
(10) Bottom hold pressure
(11) Fracture pressure

C. Provide chemical characteristics of formation fluid (attach chemical analysis).

D. Provide a description of freshwater aquifers.

(1) Depth to base of fresh water (less than 10,000 mg/l TDS).
(2) Provide a geologic description of aquifer units with name, age, depth, thickness, lithology, and average total dissolved solids.

II. Well Design and Construction

1. Provide data on surface, intermediate, and long string casing and tubing. Data must include material, size, weight, grade, and depth set.

2. Provide data on the well cement, such as type/class, additives, amount, and method of emplacement.

3. Provide packer data on the packer (if used) such as type, name and model, setting depth, and type of annular fluid used.

4. Provide data on centralizers to include number, type and depth.

5. Provide data on bottom hole completions.

6. Provide data on well stimulation used.

III. Description of Surface Equipment

1. Provide data and a sketch of holding tanks, flow lines, filters, and injection pump.

IV. Monitoring Systems

1. Provide data on recording and nonrecording injection pressure gauges, casing-tubing annulus pressure gauges, injection rate meters, temperature meters, and other meters or gauges.

2. Provide data on constructed monitor wells such as location, depth, casing diameter, method of cementing, etc.

V. Logging and Testing Results

Provide a descriptive report interpreting the results of geophysical logs and other tests. Include a description and data on deviation checks run during drilling.

VI. Provide an as-built diagrammatic sketch of the injection well(s) showing casing, cement, tubing, packer, etc., with proper setting depths. The sketch should include well head and gauges.

VII. Provide data demonstrating mechanical integrity pursuant to 40 CFR 146.08.

VIII. Report on the compatibility of injected wastes with fluids and minerals in both the injection zone and the confining zone.

IX. Report the status of corrective action on defective wells in the area of review.

X. Include the anticipated maximum pressure and flow rate at which injection will operate.

HALEY & ALDRICH, INC.
One Arizona Center
400 E. Van Buren St., Suite 545
Phoenix, AZ 85004
602.760.2450

TECHNICAL MEMORANDUM

14 September 2018
File No. 129687-010

TO: Florence Copper Inc.
Ian Ream, Senior Hydrogeologist

FROM: Haley & Aldrich, Inc.
Lauren Candreva, R.G.

Subject: Drilling, Installation, and Integrity Testing Summary
PTF Recovery Well R-03
Florence Copper Inc., Florence, Arizona

This document summarizes the drilling, installation, and testing of Production Test Facility (PTF) recovery well R-03 for Florence Copper Inc. (Florence Copper) in Florence, Arizona, including the equipment used to perform the work, completion, and the results of well testing activities. Separate well completion reports have been created for each PTF well.

The Arizona Department of Water Resources Registry ID for well R-03 is 55-227702; the Well Registry Report is included in Appendix A. Well R-03 is located in the southwest quarter of the northeast quarter of the southwest quarter of Section 28 of Township 4 north, Range 9 East of the Gila and Salt River Baseline and Meridian (D(4-9)28CAC). Well R-03 is located within the Underground Injection Control (UIC) Permitted Area of Review (AOR) for UIC Permit R9UIC-AZ3-FY11-1 and was completed as a Class III recovery well for the PTF (Figure 1).

Florence Copper contracted Hydro Resources, Inc. (Hydro Resources) to drill, install, and test recovery well R-03 in accordance with *Well Specification: Drilling, Installation, and Testing of Class III Injection and Recovery Wells, Production Test Facility, Florence, Arizona* (Haley & Aldrich, Inc. [Haley & Aldrich], 2017). A Midway 3500 drilling rig was used for all drilling and construction activities. Haley & Aldrich provided oversight of drilling activities, geophysical logging, well installation, and testing. All reported depths are in feet below ground surface unless otherwise noted.

I. Geologic Information

1. Lithology and Stratigraphy

   A. Geology of Penetrated Units

The geology penetrated during the drilling of the Class III well R-03 is summarized in the table below and a lithologic log is included in Appendix B.

Lithologic Unit Name	Depth to Bottom of Unit (feet)	Thickness of Unit (feet)	Lithology and Age of Unit
Upper Basin Fill Unit (UBFU)	281	281	Alluvium; Quaternary to Tertiary
Middle Fine-Grained Unit (MFGU)	302	21	Alluvium; Tertiary
Lower Basin Fill Unit (LBFU)	422	120	Alluvium; Tertiary to Cretaceous
Bedrock Oxide Unit (Oxide)	Not encountered	>803	Igneous porphyry – Precambrian

   B. Description of Injection Unit

Name	Bedrock Oxide Unit
Depth Drilled	1,225 feet
Thickness	>803 feet
Formation Fluid Pressure	Atmospheric plus head of freshwater – no additional formation pressure
Age of Unit	Precambrian with intrusions of Precambrian to Tertiary rocks
Porosity[1]	Approximately 6 to 8.5%
Permeability	Hydraulic Conductivity = 0.56 feet per day
Bottom Hole Temperature	30.3 degrees Celsius
Lithology	Igneous porphyry – quartz monzonite, granodiorite with diabase and andesite dykes (detailed log included in Appendix B)
Bottom Hole Pressure	Approximately 430 pounds per square inch (PSI) (pressure exerted by the column of freshwater with no additional contribution from formation pressure)
Fracture Pressure	0.65 PSI per foot
[1] Porosity values for the bedrock oxide unit are approximate values from calculated neutron porosity values from injection well borehole surveys.	

   C. Chemical Characteristics of Formation Fluid

The chemical characteristics of the formation fluid in the injection zone are summarized below and are the results of the sampling of the center PTF wellfield well R-09. The table below summarizes the primary chemical characteristics detected in a formation fluid sample collected on 23 April 2018; the complete analytical report is included in Appendix C.

Analyte	Result (mg/L)
Metals	
Aluminum	<0.08
Antimony	<0.005
Arsenic	0.0016
Barium	0.071
Beryllium	<0.0005
Cadmium	<0.00025
Calcium	140
Chromium	0.0051
Cobalt	<0.00025
Copper	0.011
Iron	<0.30
Lead	<0.0005
Magnesium	27
Manganese	0.002
Mercury	<0.001
Nickel	0.0033
Potassium	6.8
Selenium	<0.0025
Sodium	170
Thallium	<0.0005
Zinc	<0.04
Anions	
Bicarbonate	150
Chloride	310
Fluoride	<0.5
Nitrate	8.8
Sulfate	190
Field Parameters	
Total Dissolved Solids	1,000
pH	7.8
Radiochemicals	
Uranium	0.016
Notes: *mg/L = milligrams per liter*	

Sampling results for well R-03 are included in the *PTF Mine Block Ambient Groundwater Concentrations and Initial Discharge Characterization of the Underground Workings* (Brown and Caldwell, 2018).

D. Description of Freshwater Aquifers

1) The depth to the base of the freshwater aquifer is defined by the interface where deeper formation fluid exhibits a total dissolved solids (TDS) value of 10,000 milligrams per liter (mg/L). The depth of the 10,000 mg/L interface is deeper than all of the wells drilled at the site, and consequently, has not been defined.

2) The geologic description of the aquifer units is included below:

Aquifer Unit Name	Age	Depth (feet)	Thickness (feet)	Lithology	Average Total Dissolved Solids[1] (mg/L)
UBFU	Quaternary/Tertiary	0 to 281	281	Alluvium	914
LBFU	Tertiary	302 to 422	120	Alluvium	754

Notes:
[1] Average TDS values calculated from UBFU and LBFU monitoring well ambient monitoring results near the PTF.

II. Well Design and Construction

1. Well R-03 Casing Installed:

Casing	Material	Diameter (inches)	Weight (pounds per foot)	Depth (feet)	Borehole Diameter (inches)	Drilling Method
Surface	Mild Steel	24 O.D. 23¼ I.D.	94.71	0 to 40	30	Solid-stem auger
Overburden (intermediate)	Mild Steel – bottom 40 feet poly coated	14 O.D. 13⅜ I.D.	47.36	0 to 501	20	Reverse flooded rotary
Well Casing	Fiberglass Reinforced Plastic	5.47 O.D. 4.74 I.D.	5.40	-2.0 to 522	Inside overburden casing to 501 feet; 12¼	Inside overburden casing/reverse flooded rotary
Screen	PVC SCH80 with 0.080-inch wide slots	5.56 O.D. 4.81 I.D.	4.08	522 to 642 662 to 882 902 to 1,203	12¼	Reverse flooded rotary
Blank Intervals	PVC SCH80	5.56 O.D. 4.81 I.D.	14.75	642 to 662 882 to 902	12¼	Reverse flooded rotary

Notes:
I.D. = inside diameter
O.D. = outside diameter
PVC = polyvinyl chloride
SCH = Schedule

2. Well Cement

Cement Interval	Cement Type	Additives	Amount Installed (cubic yards)	Method of Emplacement
Surface Casing	Type V Neat 21 sack slurry	None	3.5	Submerged tremie
Overburden Casing	Type V Neat 21 sack slurry	None	34.7	Displacement - installed through drillable grout shoe with one-way stab-in valve, welded to the bottom of the casing
Well Casing	Type V Neat 21 sack slurry	None	17.7	Submerged Tremie

Field forms documenting pipe tallies, annular materials, and cement tickets are included in Appendix D.

3. Annular Packers

No annular packers were used during construction of well R-03.

4. Centralizers

Casing	Centralizer Type	Number and Spacing
Overburden	Mild Steel – welded	13 installed – every 40 feet
Well – FRP and PVC	Stainless steel – Heavy Duty	26 installed – every 40 feet
Notes: *FRP = fiberglass reinforced plastic* *PVC = polyvinyl chloride*		

5. Bottom Hole Completion

There is no bottom hole completion as this is not an oil/gas well. The well was completed at the bottom with a stainless-steel endcap of the same diameter as the well screen.

6. Well Stimulation

No well stimulation was used during the drilling and construction of well R-03.

III. Description of Surface Equipment

1. Surface Equipment

   Well R-03 is a recovery well and has been equipped with a submersible pump. The 2-inch diameter discharge pipe extends from the well head and into the manifold that conveys the fluid directly to the solvent extraction/electrowinning plant on-site. A diagram of the wellhead is included as Figure 2.

IV. Monitoring Systems

1. Well Monitoring Equipment

Equipment Type	Location	Type	Purpose
Annular Pressure Transducer	Well Annulus – 637 feet bgs	Recording	Monitor water column/pressure
Pressure Transducer	Well Casing – appx. 400 feet bgs	Recording	Monitor water column/pressure
Flow Meter	Wellhead	Recording	Monitor extraction rate
Pressure Gauge	Wellhead	Nonrecording	Monitor wellhead pressure

2. Monitoring Wells

   There are a total of 16 monitoring wells associated with the PTF: 7 point-of-compliance (POC) wells, 7 United States Environmental Protection Agency (USEPA) supplemental monitoring wells, and 2 operational monitoring wells. The POC wells are located outside the AOR and are not constructed as Class III wells. The supplemental monitoring and operational monitoring wells are located within the AOR and are constructed as Class III wells as required by the UIC Permit. The wells are summarized in the tables below by type.

POC Wells						
Well ID	**Location X/Y (State Plane NAD 83)**	**Depth (feet)**	**Well Nom. Diameter (inches)**	**Cementing Method**	**Screened Interval (feet)**	**Screened Lithologic Unit**
M14-GL	846750.23 746461.52	859	5 9/16 OD	Submerged tremie	778 to 838	LBFU
M15-GU	846697.17 746464.82	615	5 9/16 OD	Submerged tremie	554 to 594	LBFU
M22-O	846751.26 746514.47	1,140	5 9/16 OD to 528 feet; 4½ OD to 1,140 feet	Submerged tremie	932 to 1,130	Oxide

POC Wells						
Well ID	**Location X/Y (State Plane NAD 83)**	**Depth (feet)**	**Well Nom. Diameter (inches)**	**Cementing Method**	**Screened Interval (feet)**	**Screened Lithologic Unit**
M23-UBF	846688.13 746512.48	250	6 5/8 OD	Submerged tremie	210 to 250	UBFU
M52-UBF	851092.00 774178.00	274	5 9/16	Submerged tremie	198 to 273	UBFU
M54-LBF	847331.96 746682.61	630	5 9/16	Submerged tremie	310 to 629	LBFU
M54-O	847342.99 746702.36	1,199	5 9/16	Submerged tremie	668 to 1,198	Oxide
OD = outside diameter						

Supplemental Monitoring Wells						
Well ID	**Location X/Y (State Plane NAD 83)**	**Depth (feet)**	**Well Nom. Diameter (inches)**	**Cementing Method**	**Screened Interval (feet)**	**Screened Lithologic Unit**
M55-UBF	847541.46 746280.63	261	5	Submerged tremie	240 to 260	UBFU
M56-LBF	847518.70 746303.41	340	5	Submerged tremie	320 to 340	LBFU
M57-O	847378.37 746248.93	1,200	5	Submerged tremie	523 to 1,199	Oxide
M58-O	847672.23 746595.97	1,200	5	Submerged tremie	594 to 1,199	Oxide
M59-O	847934.95 746218.89	1,201	5	Submerged tremie	534 to 1,199	Oxide
M60-O	847599.37 745903.70	1,201	5	Submerged tremie	444 to 1,200	Oxide
M61-LBF	848184.46 746148.88	629	5	Submerged tremie	429 to 629	LBFU

Operational Monitoring Wells						
Well ID	**Location X/Y (State Plane NAD 83)**	**Depth (feet)**	**Well Nom. Diameter (inches)**	**Cementing Method**	**Screened Interval**	**Screened Lithologic Unit**
MW-01-LBF	847487.97 746360.54	444	5	Submerged tremie	330 to 440	LBFU
MW-01-O	847499.04 746369.31	1,200	5	Submerged tremie	500 to 1,200	Oxide

V. Logging and Testing Results

Borehole geophysical logging was conducted on well R-03 in four phases: 1) open-hole surveys in the 20-inch borehole prior to installation of the overburden casing; 2) cased-hole surveys in the 14-inch casing; 3) open-hole surveys in the 12.25-inch borehole prior to installation of the well casing and screen; and 4) cased-hole surveys in the completed well.

The open-hole geophysical surveys completed at well R-03 included:

- Spontaneous potential;
- Natural gamma;
- Electrical resistivity (short and long normal);
- Caliper with calculated volume;
- Temperature;
- Sonic; and
- Deviation.

The cased-hole geophysical surveys completed included:

- Cement bond log (overburden steel casing);
- Sonic (for cement bond with fiberglass reinforced plastic [FRP]);
- 4 Pi Density (for cement bond with FRP);
- Dual Density (for cement bond with FRP);
- Natural Gamma;
- Fluid Conductivity;
- Temperature;
- Gyroscopic Deviation Survey; and
- Video Survey.

Open-hole geophysical surveys were used to support identification of the lithologic contacts, to evaluate the condition of the borehole, and to evaluate the deviation of the borehole.

The primary logs used to evaluate lithologic contacts are natural gamma ray, short (16-inch) and long (64-inch) normal electrical resistance, and single point-resistance. The lithologic contacts for the Middle Fine-Grained Unit (MFGU) were selected based on the short and long resistance and the single-point resistance. All the resistivity logs decreased and stayed consistently low through the MFGU. This contact is generally a relatively sharp decrease in resistance at the top of the unit and a gradual increase in resistance below the bottom of the unit.

The contact between the Lower Basin Fill Unit (LBFU) and the bedrock was identified primarily with natural gamma and correlated with the resistance logs. There is a consistent increase in gamma at the contact between the LBFU and the bedrock that had been identified and documented at the site during exploration in the 1990s. For well R-03, the gamma is consistently at approximately 60 to 65 American Petroleum Institute (API) units throughout the Upper Basin Fill Unit (UBFU) and MFGU, a slight increase to approximately 85 to 100 API units in the LBFU, and an increase at approximately 422 feet to over 150 API units. After the increase at 422 feet, the natural gamma begins to vary significantly more than it did in the alluvial units. This change in the response of the natural gamma indicates the contact with the bedrock unit. Also, at this approximate depth the resistance increases gradually which is likely due to bedrock containing less water causing a generally increased resistivity.

Cased-hole geophysical surveys were conducted to evaluate the cement seal and the casing-cement bond, to document baseline fluid temperature and conductivity, and to evaluate the plumbness of the well. The cement-bond is discussed in Section VII.

Copies of all the open-hole geophysical logs and cased-hole temperature, fluid conductivity, and natural gamma are included in Appendix E; a figure summarizing the open-hole logs used to evaluate geology is included as Figure 3. The cased-hole logs used to evaluate cement bond are included in Appendix F**.**

VI. Well As-Built Diagram

A diagram showing the wellhead completion for well R-03 is included as Figure 2. A well as-built diagram for well R-03 is included as Figure 4.

VII. Demonstration of Mechanical Integrity

A demonstration of Part I mechanical integrity of the well was completed using a standard annular pressure test (SAPT) in accordance with Part II.E.3.a.i.A of the UIC Permit. Mechanical integrity will be demonstrated every 2 years during operations and will be confirmed by daily injection pressure monitoring that will be conducted per the UIC Permit once the well is operational. Well R-03 SAPT is summarized below.

The mechanical integrity of the blank well casing was tested by performing a SAPT on 11 April 2018. The SAPT was conducted by installing an inflatable straddle packer assembly in the well. The bottom packer was installed near the bottom of the FRP-cased portion of the well and the top packer was near the surface, the packers were inflated to form a seal against the casing. The bottom 5 feet of the packer drop pipe was perforated to allow for communication between the tubing and the annulus of the packer assembly. The drop pipe extended through the wellhead and a high pressure/low volume pump was attached to the drop pipe to pressurize the test interval. A valve on the drop pipe at the surface was used to isolate the test interval once the planned test pressure was achieved.

An In-Situ LevelTROLL® pressure transducer with a data logger was installed at the well head and was connected to the packer assembly annulus interval via a National Pipe Thread adapter. The LevelTROLL was used to monitor and record pressure inside the well during the SAPT. To conduct the SAPT, water was pumped from a nearby well immediately prior to testing. Before the water was pumped into the test well, the water temperature was measured to ensure that it was similar to the ambient groundwater temperature of the test well to reduce the potential of differential temperature effects on the well casing. The SAPT for the Class III well was conducted by applying hydraulic pressure to well casing and shutting in pressure between the packer and wellhead assembly, monitoring the shut-in pressure for a 30-minute period, then measuring the volume of water returned from the well casing after the pressure was released.

On 11 April 2018, the packer was installed to approximately 502 feet and the SAPT was conducted successfully three times. The USEPA SAPT form, a table of the data, and a chart of the data is provided in Appendix G.

Part II mechanical integrity is demonstrated by the cementing records included in this report (in accordance with Part II.E.3.ii.C of the UIC Permit) and will be demonstrated during operations by annular conductivity monitoring on the observation and multi-level sampling wells (in accordance with Part II.E.3.a.ii.A of the UIC Permit).

Cemented Interval	Cement Type	Calculated Grout Volume (cubic yards)	Installed Grout Volume (cubic yards)
Surface Casing	Type V 21 sack neat cement slurry	2.6	3.5
Overburden Casing	Type V 21 sack neat cement slurry	31.1	34.7
Well Casing	Type V 21 sack neat cement slurry	16.0	17.7

On 8 December 2017, a cement bond log was run on the overburden casing. On 31 January 2018, a suite of logs was run over the entire length of the completed well to verify the grout seal; a summary of the geophysical logs completed to demonstrate cement bond are included in Appendix F.

The cement bond of the steel casing was evaluated by the geophysical contractor by calculating a bond index. The bond index was calculated to be an average of 92 percent at well R-03 over the cement grouted interval from 1 to 490 feet; this data is included on the summary log in Appendix G. A sonic log was also run in the steel casing and the sonic data indicate a consistent density in the steel cased cemented interval of well R-03, which supports the cement bond log data.

There is not a bond log tool designed to evaluate cement bond with FRP casing, so the cement interval with the FRP casing at well R-03 was evaluated using density logs. The logs conducted include sonic, focused density, and 4pi density logs. The measured density of the cased interval at R-03 indicate there are no significant cement deficiencies from the approximately 226 feet (static water Level) to 492 feet, and no significant cement deficiencies were noted in the 4pi density data collected from 15 to 492 feet. There were some very localized, relatively low density intervals identified in the density logs but they were insignificant, only extending 2 to 3 feet. A summary of the FRP cased data is included in the well completion summary for well R-03 in Appendix G.

VIII. Compatibility of Injected Waste

The Florence Copper Project is a Class III mineral extraction project and does not include the injection of any waste products of any kind. The injected fluid (lixiviant) is a carefully constituted in-situ copper recovery solution that will be recovered and recycled following injection.

The compatibility of the lixiviant was evaluated as part of the geochemical modeling completed by Florence Copper and summarized in the *Geochemical Evaluation to Forecast Composition of Process Solutions for In-Situ Copper Recovery Pilot Test Facility at Florence Copper, Florence Arizona* (Daniel B. Stephens Inc., 2014) which was included in Attachment H of the UIC Permit Application.

IX. Status of Corrective Action on Defective Wells in the Area of Review

There are not currently any defective wells in the AOR.

X. Maximum Pressures and Flow Rates for R-03

Maximum Operating Pressure	Maximum Flow (Extraction)
Atmospheric	No maximum extraction flow

This well is a recovery well used to extract solution so there is no maximum flow. However, in accordance with Section 2.2.1.1 of the Aquifer Protection Permit (APP), the recovery rate for the entire wellfield must always exceed the injection rate on a daily average, and in accordance with Part II.E.5.a of the UIC Permit the recovery rate will not fall below 110 percent of the injection rate on a daily average.

XI. Well Development

Well R-03 was developed by the airlift method, followed by pumping, and was completed by Hydro Resources using a workover rig. To purge drilling fluids and solids, the well was air-lift developed at various depths ranging from approximately 400 feet to 1,200 feet. During development, the airlift pump was turned on and off to surge the well. Airlift development started on 27 January 2018 and was conducted over a period of 6 days. On 31 January 2018, approximately 33 gallons of chlorine was added to the well. The discharge was clear and sand-free at the end of the airlift development period.

To pump develop the well, a submersible pump was temporarily installed to approximately 1,150 feet on 3 February 2018. Prior to pumping, the static water level was measured at approximately 231 feet. Pump development was conducted at approximately 50 gallons per minute (gpm) over a period of 2 days (4 and 5 February 2018), during which time the submersible pump was periodically turned off to surge the well. The discharge was sand-free and visually clear throughout the pump development period, with turbidity values less than 5 Nephelometric Turbidity Units at the end of the development period. Well development forms are included in Appendix H.

XII. Well Completion

A well video survey was conducted on 7 February 2018; the video log report is included as Appendix I. The video log depths are presented in feet below the top of the casing and thus vary slightly from what is recorded; however, these values are the same with the correction for stick up.

The video log indicates the total depth reached was 1,187 feet; the bottom of the well was airlifted on 1 February down to 1,197 feet.

A gyroscopic survey was also conducted on the completed well on 7 February 2018; the results are included in Appendix I.

The surveyed location for well R-01 is:

Northing (feet)	Easting (feet)	Measuring Point Elevation (feet amsl)
746131.72	847836.12	1480.04
***Notes**:* *Northing and easting locations provided in State Plane North American Datum 1983, vertical location provided in North American Vertical Datum 1988.* *amsl – feet above mean sea level*		

XIII. Downhole Equipment

On 11 July 2018, the permanent pump equipment was installed in the well. The equipment installed included the following:

- Wilo 7.5 horsepower, 40-gpm pump – intake at 810 feet;
- 2-inch Schedule 120 threaded and coupled polyvinyl chloride column pipe with 316L stainless steel couplers from the pump to approximately 500 feet;
- 2-inch Schedule 40 threaded and coupled 316L stainless steel column pipe with 316L stainless steel couplers from approximately 500 feet to the wellhead;
- 316L braided stainless steel safety cable was installed from the pump to the wellhead;
- Pressure transducer; and
- 1-inch nominal diameter sounding tube.

The type and depth of equipment installed in each well is not constrained by the UIC Permit or the APP. This information is provided in accordance with Section 2.7.4.3 of the APP. Operational consideration may require that the type and depth of equipment may need to be changed in response to conditions observed during operations.

XIV. References

Brown and Caldwell, Inc., 2018. *PTF Mine Block Ambient Groundwater Concentrations and Initial Discharge Characterization of the Underground Workings.* Prepared for Florence Copper. August.

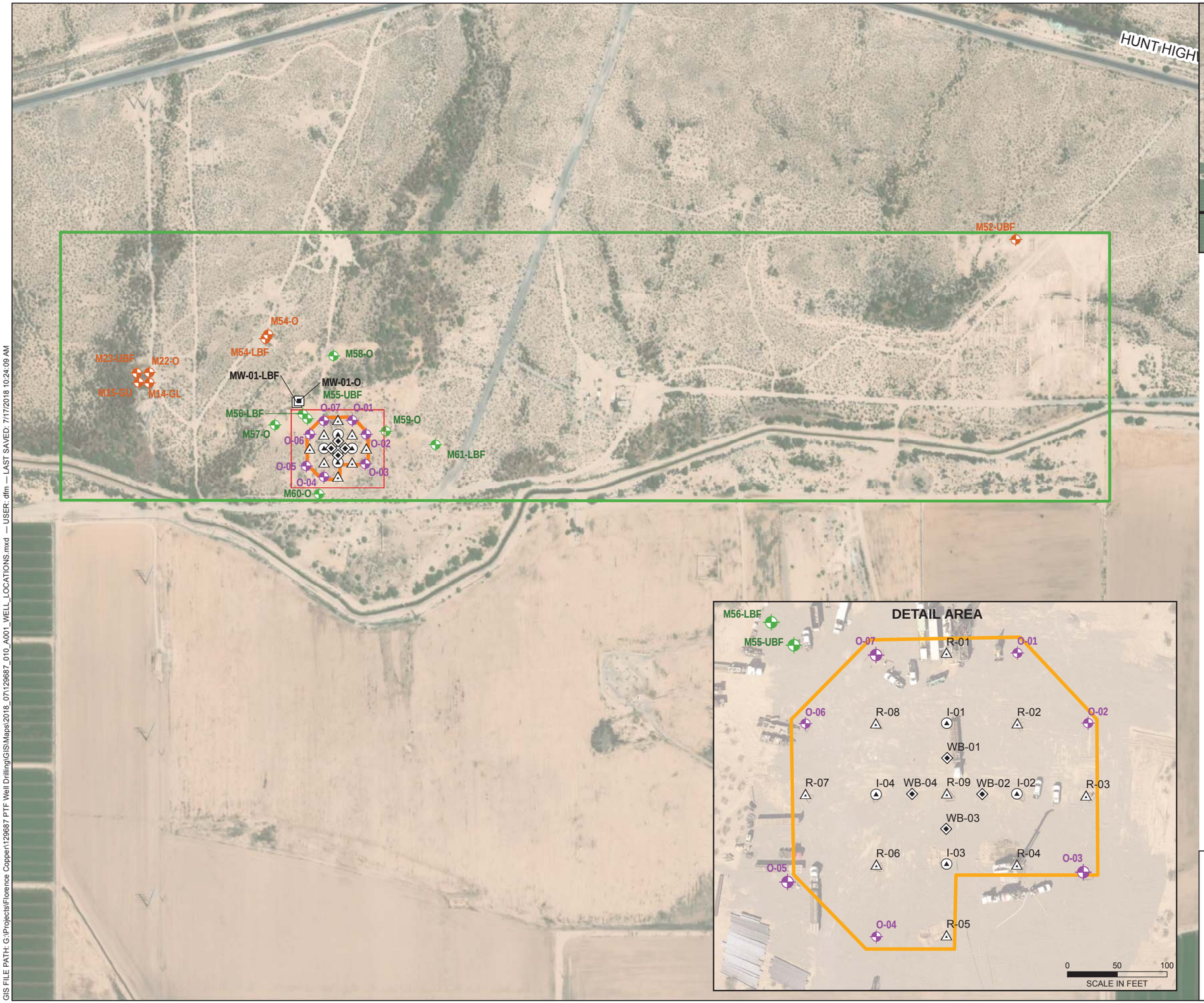
Daniel B. Stephens, Inc., 2014. *Geochemical Evaluation to Forecast Composition of Process Solutions for In-Situ Copper Recovery Pilot Test Facility at Florence Copper, Florence Arizona.* Prepared for Florence Copper. May.

Haley & Aldrich, Inc., 2017. *Well Specification: Drilling, Installation, and Testing of Class III Injection and Recovery Wells, Production Test Facility, Florence, Arizona*. Revised September 2017.

Enclosures:

- Figure 1 – Well Locations
- Figure 2 – Recovery Well Head Detail
- Figure 3 – Geophysical Data and Lithologic Log
- Figure 4 – Well R-03 As-Built Diagram
- Appendix A – Arizona Department of Water Resources Well Registry Report
- Appendix B – Lithologic Log
- Appendix C – Chemical Characteristics of Formation Water
- Appendix D – Well Completion Documentation
- Appendix E –Geophysical Logs
- Appendix F – Cement Bond Log Summary
- Appendix G – SAPT Documentation
- Appendix H – Well Development Field Forms
- Appendix I – Well Video Log and Gyroscopic Survey Reports

FIGURES



0 1,250 2,500
SCALE IN FEET

LEGEND

- OBSERVATION WELL
- SUPPLEMENTAL MONITORING WELL
- POINT-OF-COMPLIANCE WELL

PTF WELL

- INJECTION
- RECOVERY
- WESTBAY WELL
- OPERATIONAL MONITORING
- PTF WELL FIELD
- STATE LAND LEASE

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI

N

0 500 1,000
SCALE IN FEET

HALEY ALDRICH

FLORENCE COPPER PROJECT
FLORENCE, ARIZONA

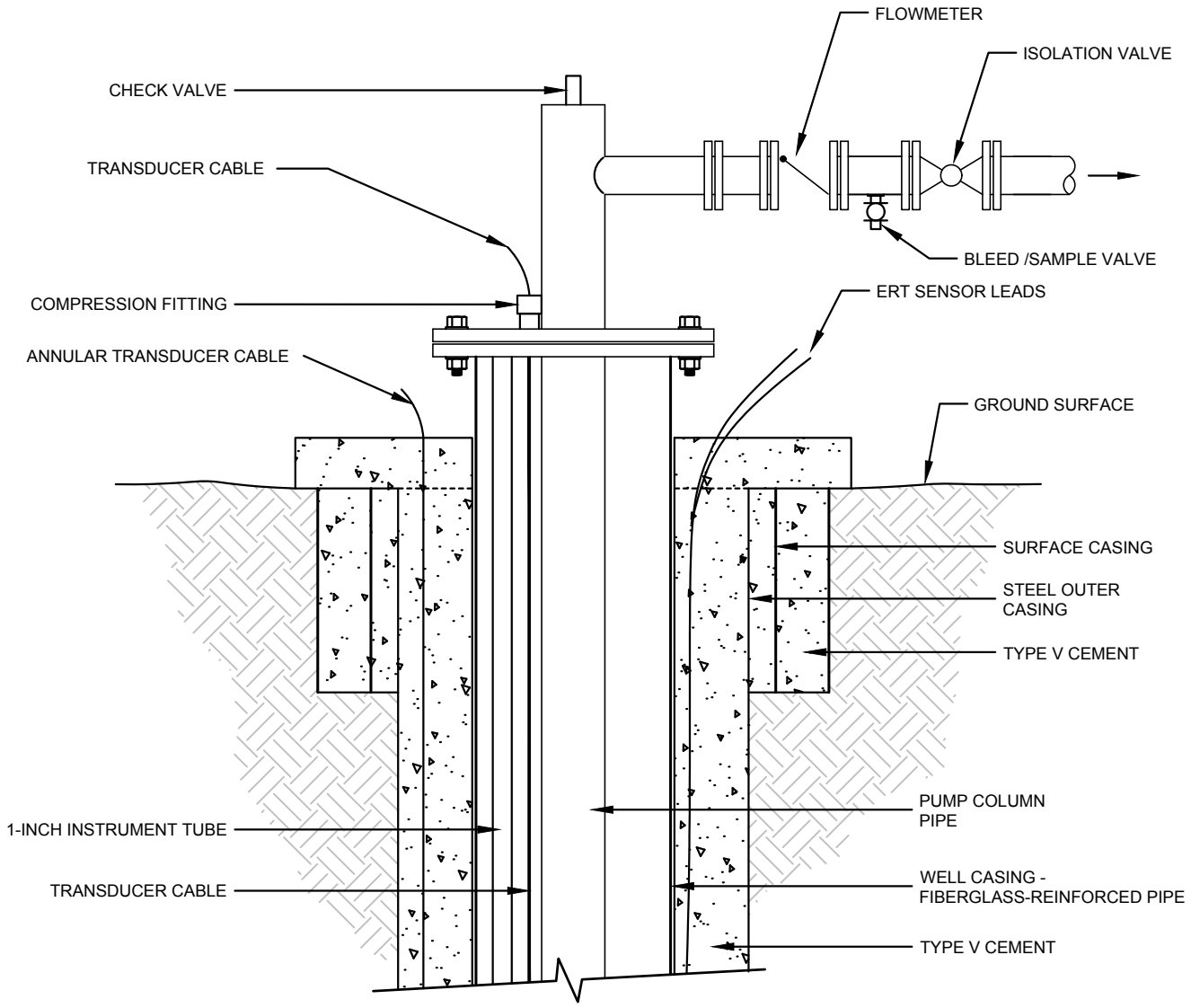
WELL LOCATIONS

FLORENCE COPPER INC.

AUGUST 2018

FIGURE 1

GIS FILE PATH: G:\Projects\Florence Copper\129687 PTF Well Drilling\GIS\Maps\2018_07\129687_010_A001_WELL_LOCATIONS.mxd — USER: dfm — LAST SAVED: 7/17/2018 10:24:09 AM



NOTES

1. ERT - ELECTRICAL RESISTIVITY TOMOGRAPHY

HALEY ALDRICH

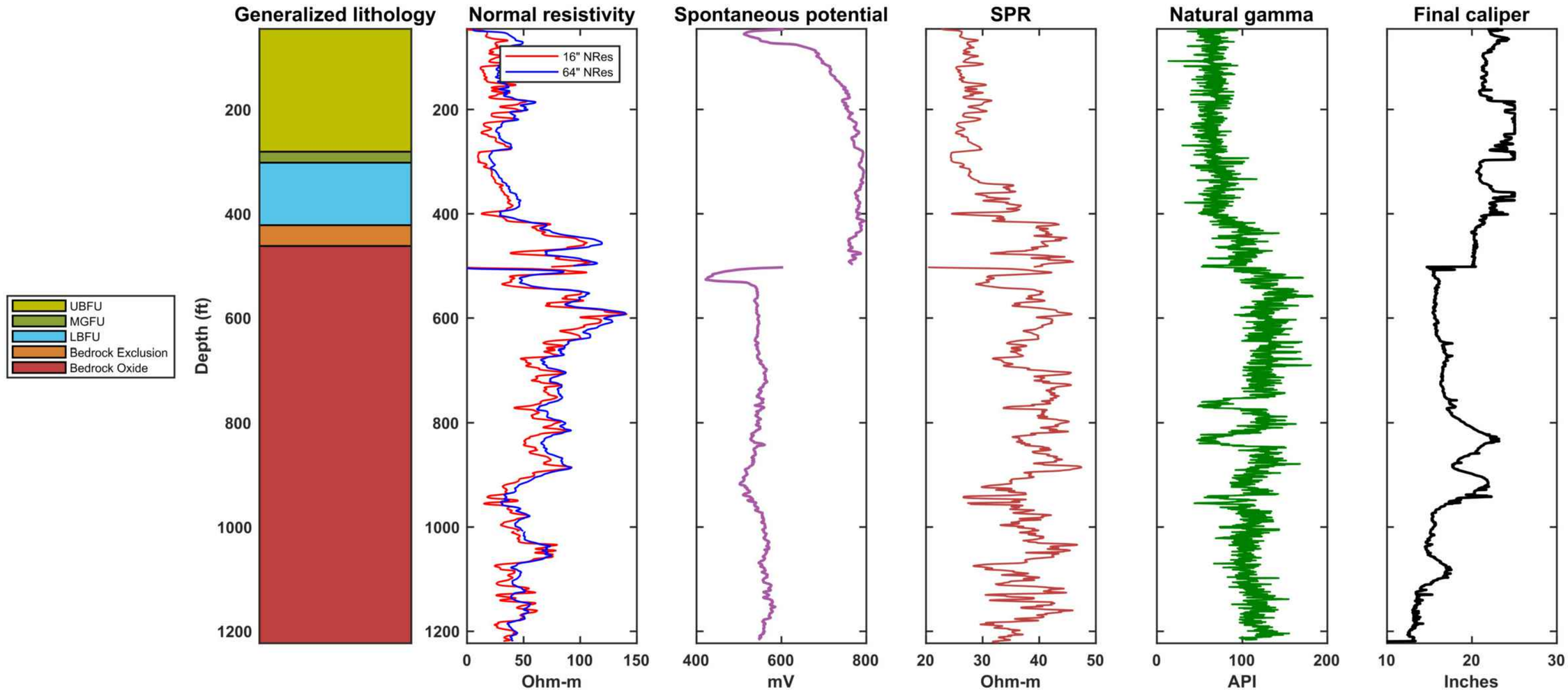
PRODUCTION TEST FACILITY
FLORENCE COPPER, INC.
FLORENCE, ARIZONA

RECOVERY WELL HEAD DETAIL

FLORENCE COPPER INC.

SCALE: NOT TO SCALE
SEPTEMBER 2018

FIGURE 2



HALEY ALDRICH

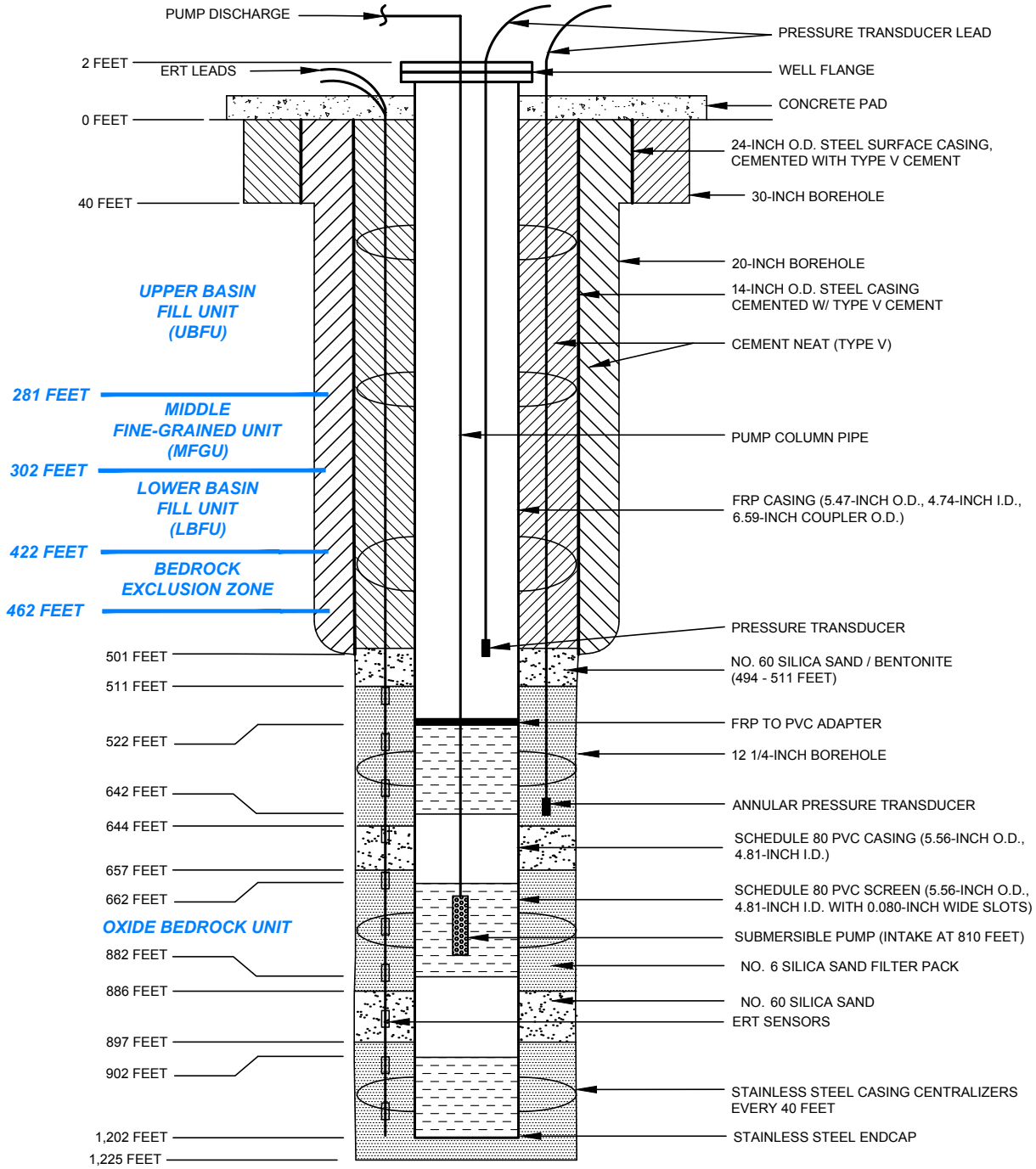
PRODUCTION TEST FACILITY
FLORENCE COPPER, INC.
FLORENCE, ARIZONA

R-03 RECOVERY WELL GEOPHYSICAL DATA AND LITHOLOGIC LOG

FLORENCE COPPER

SCALE: AS SHOWN
SEPTEMBER 2018

FIGURE 3



ANNULAR SENSOR DETAILS

- ERT SENSOR DEPTHS - 512, 572, 632, 692, 752, 812, 872, 932, 992, 1032, 1092, 1172
- ANNULAR TRANSDUCER DEPTH - 637 FEET

NOTES

1. WELL REGISTRATION NO.: 55-227702
2. CADASTRAL LOCATION: D(4-9) 28 CAC
3. MEASURING POINT ELEVATION; 1481.87 FEET AMSL
4. I.D. = INSIDE DIAMETER
5. O.D. = OUTSIDE DIAMETER
6. PVC = POLYVINYL CHLORIDE
7. FRP = FIBERGLASS REINFORCED PLASTIC
8. ERT = ELECTRICAL RESISTIVITY TOMOGRAHY
9. SOUNDING TUBE INSTALLED TO ~ 500 FEET

HALEY ALDRICH

PRODUCTION TEST FACILITY
FLORENCE COPPER, INC.
FLORENCE, ARIZONA

RECOVERY WELL R-03 AS-BUILT DIAGRAM

FLORENCE COPPER

SCALE: NOT TO SCALE
SEPTEMBER 2018

FIGURE 4

APPENDIX A

Arizona Department of Water Resources Well Registry Report

Arizona Department of Water Resources
Water Management Division
P.O. Box 36020 Phoenix, Arizona 85067-6020
(602) 771-8627 • (602) 771-8690 fax
· www.azwater.gov ·

Well Driller Report and Well Log

CJ

THIS REPORT MUST BE FILED WITHIN **30 DAYS** OF COMPLETING THE WELL.

PLEASE PRINT CLEARLY USING BLACK OR BLUE INK.

FILE NUMBER: D (4-9) 28 CAC
WELL REGISTRATION NUMBER: **55 -** 227702
PERMIT NUMBER (IF ISSUED):

SECTION 1. DRILLING AUTHORIZATION

Drilling Firm

Mail To:

NAME	DWR LICENSE NUMBER
Hydro Resources Inc.	816
ADDRESS: 13027 County Rd. 18 Unit C	TELEPHONE NUMBER: (303) 857-7544
CITY / STATE / ZIP: Ft. Lupton, CO 80621	FAX: (303) 857-2826

SECTION 2. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL: Florence Copper Inc.

MAILING ADDRESS: 1575 W. Hunt Hwy

CITY / STATE / ZIP CODE: Florence, AZ 85132

CONTACT PERSON NAME AND TITLE: Ian Ream - Sr. Hydrologist

TELEPHONE NUMBER: (520) 374-3984 FAX:

WELL NAME (e.g., MW-1, PZ-3, Lot 25 Well, Smith Well, etc.): R - 03

Location of Well

WELL LOCATION ADDRESS (IF ANY):

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
4S	9E	28	SW ¼	NE ¼	SW ¼

LATITUDE			LONGITUDE		
33 ° Degrees	3 ' Minutes	0.70 "N Seconds	-111 ° Degrees	26 ' Minutes	3.01 "W Seconds

METHOD OF LATITUDE/LONGITUDE (CHECK ONE)
☒ *GPS: Hand-Held ☐ *GPS: Survey-Grade

LAND SURFACE ELEVATION AT WELL: 1492 Feet Above Sea Level

METHOD OF ELEVATION (CHECK ONE)
☒ *GPS: Hand-Held ☐ *GPS: Survey-Grade

*GEOGRAPHIC COORDINATE DATUM (CHECK ONE)
☒ NAD-83 ☐ Other (*please specify*):

COUNTY: PINAL

ASSESSOR'S PARCEL ID NUMBER: BOOK | MAP | PARCEL

SECTION 3. WELL CONSTRUCTION DETAILS

Drill Method

CHECK ALL THAT APPLY
- ☐ Air Rotary
- ☐ Bored or Augered
- ☐ Cable Tool
- ☐ Dual Rotary
- ☒ Mud Rotary
- ☒ Reverse Circulation
- ☐ Driven
- ☐ Jetted
- ☐ Air Percussion / Odex Tubing
- ☐ Other *(please specify)*:

Method of Well Development

CHECK ALL THAT APPLY
- ☒ Airlift
- ☐ Bail
- ☐ Surge Block
- ☒ Surge Pump
- ☐ Other *(please specify)*:

Condition of Well

CHECK ONE
- ☒ Capped
- ☐ Pump Installed

Method of Sealing at Reduction Points

CHECK ONE
- ☐ None
- ☐ Packed
- ☐ Swedged
- ☐ Welded
- ☐ Other *(please specify)*:

Construction Dates

DATE WELL CONSTRUCTION STARTED: 11/30/2017

DATE WELL CONSTRUCTION COMPLETED: 05/22/2018

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and belief.

SIGNATURE OF QUALIFYING PARTY:

DATE: 5/22/2018

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 227702

SECTION 4. WELL CONSTRUCTION DESIGN (AS BUILT) (attach additional page if needed)

Depth

DEPTH OF BORING		DEPTH OF COMPLETED WELL	
1225	Feet Below Land Surface	1202	Feet Below Land Surface

Water Level Information

STATIC WATER LEVEL		DATE MEASURED	TIME MEASURED	IF FLOWING WELL, METHOD OF FLOW REGULATION
231	Feet Below Land Surface	02/04/2018	1 PM	☐ Valve ☐ Other:

Borehole

DEPTH FROM SURFACE		BOREHOLE DIAMETER (inches)
FROM (feet)	TO (feet)	
0	40	30
40	494	20
494	1225	12.25

Installed Casing

DEPTH FROM SURFACE		OUTER DIAMETER (inches)	MATERIAL TYPE (T)				PERFORATION TYPE (T)						SLOT SIZE IF ANY (inches)
FROM (feet)	TO (feet)		STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE	
0	40	24.5	X				X						
0	494	14.5	X				X						
0	521	5.44				FRP	X						
521	642	5.56		X							X		.080
642	662	5.56		X			X						
662	882	5.56		X							X		.080
882	902	5.56		X			X						
902	1202	5.56		X							X		.080

Installed Annular Material

DEPTH FROM SURFACE		ANNULAR MATERIAL TYPE (T)								FILTER PACK		
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	BENTONITE: GROUT	BENTONITE: CHIPS	BENTONITE: PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE	SAND	GRAVEL	SIZE
0	40			X								
0	494			X								
494	511							X				
511	644									X		6-9
644	657							X				
657	886									X		6-9
886	897							X				
897	1225									X		6-9

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 227702

SECTION 5. GEOLOGIC LOG OF WELL

DEPTH FROM SURFACE		Description	Check (T) every interval where water was encountered (if known)
FROM (feet)	TO (feet)	Describe material, grain size, color, etc.	
0	281	UPPER BASIN FILL UNIT	
281	302	MIDDLE FINE GRAINED UNIT	
302	422		
422	1225	BEDROCK OXIDE UNIT	

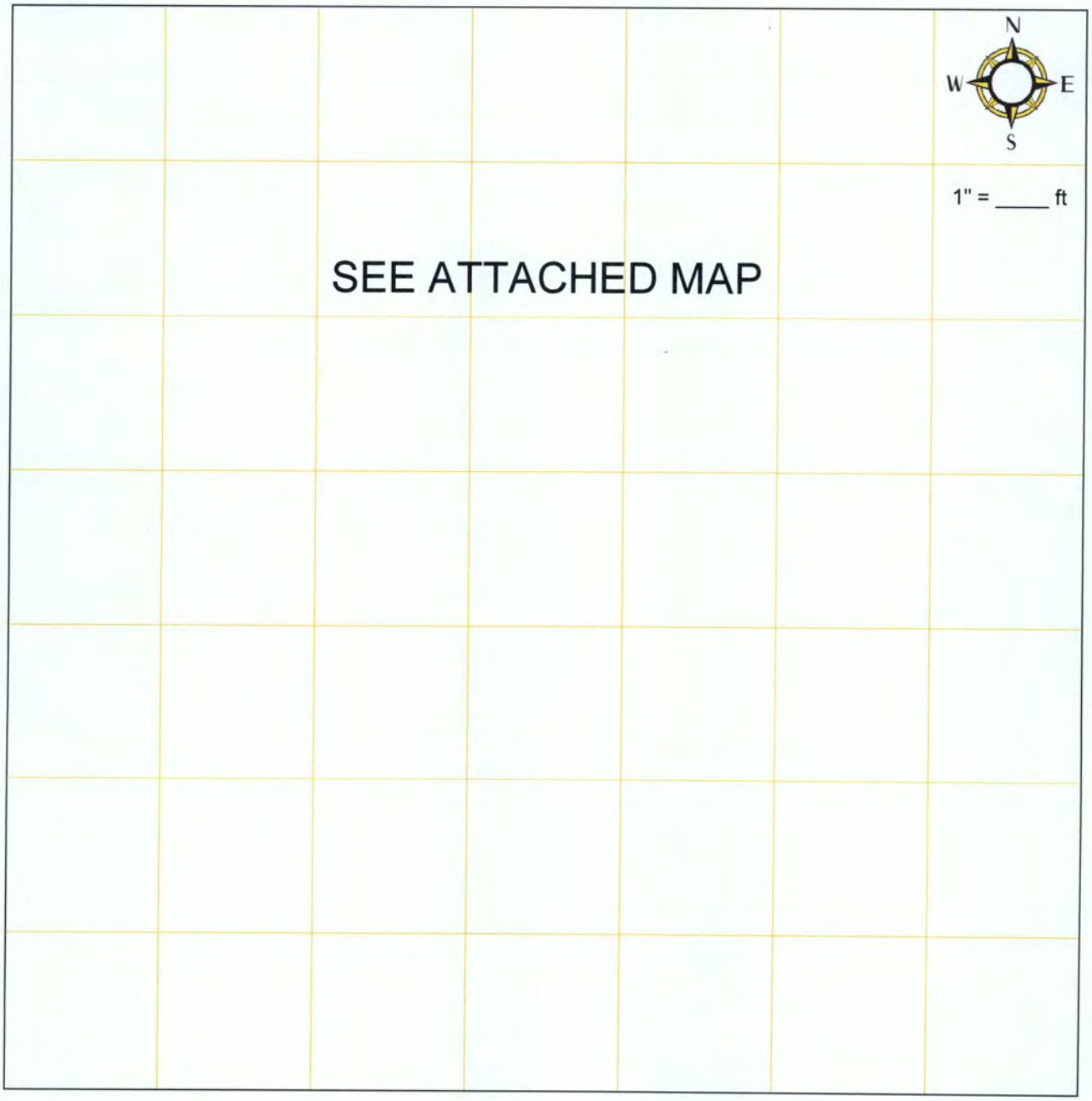
Well Driller Report and Well Log

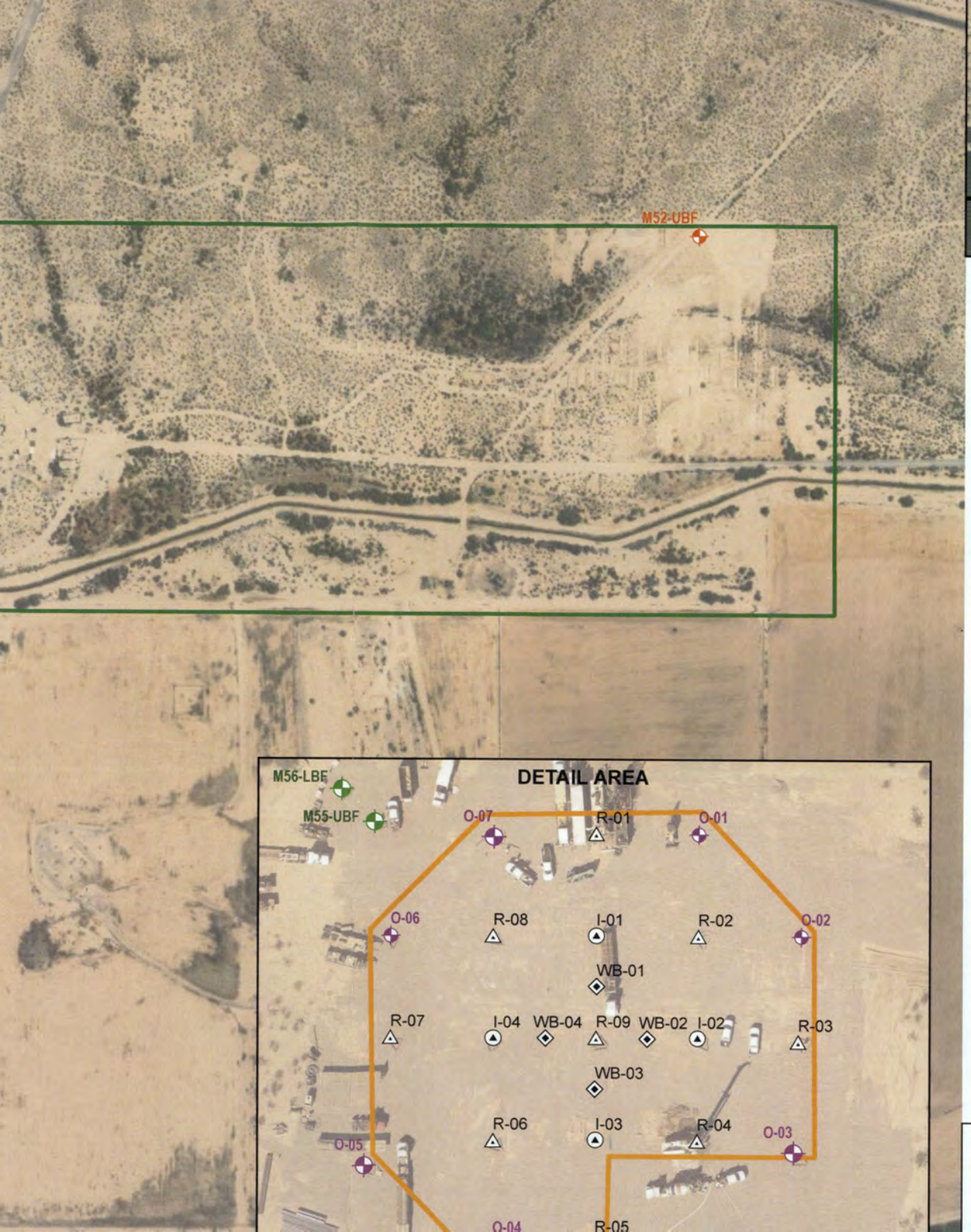
WELL REGISTRATION NUMBER
55 - 227702

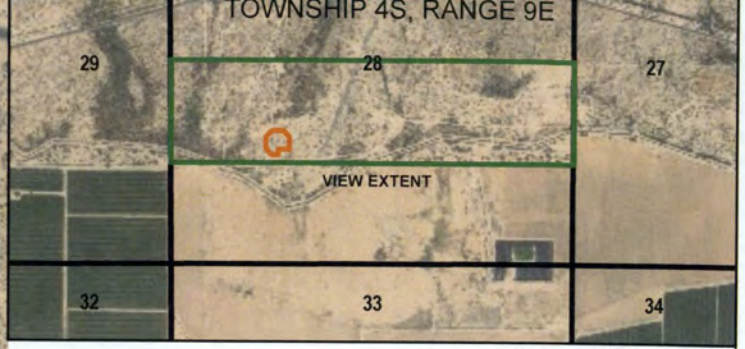
SECTION 6. WELL SITE PLAN

NAME OF WELL OWNER	COUNTY ASSESSOR'S PARCEL ID NUMBER		
Florence Copper Inc.	BOOK	MAP	PARCEL

- Please draw the following: (1) the boundaries of property on which the well was located; (2) the well location; (3) the locations of all septic tank systems and sewer systems on the property or within 100 feet of the well location, even if on neighboring properties; and (4) any permanent structures on the property that may aid in locating the well.
- Please indicate the distance between the well location and any septic tank system or sewer system.







0 1,250 2,500
SCALE IN FEET

LEGEND

- OBSERVATION WELL
- SUPPLEMENTAL MONITORING
- POINT-OF-COMPLIANCE WELL

PTF WELL

- INJECTION
- RECOVERY
- WESTBAY WELL
- OPERATIONAL MONITORING
- PTF WELL FIELD
- STATE LAND LEASE

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI

N

0 500 1,000
SCALE IN FEET

HALEY ALDRICH

FLORENCE COPPER PROJECT
FLORENCE, ARIZONA

Run Date: 09/07/2017

AZ DEPARTMENT OF WATER RESOURCES

WELL REGISTRY REPORT - WELLS55

Location D 4.0 9.0 28 C A C

Well Reg.No 55 - 227702

AMA PINAL AMA

Registered Name FLORENCE COPPER INC
1575 W HUNT HWY
FLORENCE AZ 85132

File Type NEW WELLS (INTENTS OR APPLICATIONS)
Application/Issue Date 08/21/2017

Owner OWNER
Driller No. 816
Driller Name HYDRO RESOURCES - ROCKY MOUNTAIN, INC.
Driller Phone 303-857-7540
County PINAL
Intended Capacity GPM 0.00

Well Type NON-EXEMPT
SubBasin ELOY
Watershed UPPER GILA RIVER
Registered Water Uses INDUSTRIAL
Registered Well Uses WATER PRODUCTION
Discharge Method NO DISCHARGE METHOD LISTED
Power NO POWER CODE LISTED

Well Depth	0.00	**Case Diam**	0.00	**Tested Cap**	0.00
Pump Cap.	0.00	**Case Depth**	0.00	**CRT**	
Draw Down	0.00	**Water Level**	0.00	**Log**	
		Acres Irrig	0.00	**Finish**	NO CASING CODE LISTED

Contamination Site: NO - NOT IN ANY REMEDIAL ACTION SITE

Tribe: Not in a tribal zone

Comments R-03

55-227702

Current Action

9/1/2017 550 DRILLING AUTHORITY ISSUED
Action Comment: sm

Action History

9/1/2017 555 DRILLER & OWNER PACKETS MAILED
Action Comment: sm

8/29/2017 867 APP/NOI HYDRO/WATER QUALITY REVIEW COMPLETE
Action Comment: pw

8/28/2017 866 APP/NOI SENT TO HYDRO/WATER QUALITY REVIEW
Action Comment: sm

8/21/2017 150 NOI RECEIVED FOR A NEW PRODUCTION WELL
Action Comment: sm

ARIZONA DEPARTMENT OF WATER RESOURCES
GROUNDWATER PERMITTING AND WELLS UNIT
1110 Washington St., Suite 310, Phoenix, AZ 85007-2952

THIS AUTHORIZATION SHALL BE IN THE POSSESSION OF THE DRILLER DURING ALL DRILL OPERATIONS

WELL R-03

WELL REGISTRATION NO: 55-227702

AUTHORIZED DRILLER: HYDRO RESOURCES **LICENSE NO:** 816

A NOTICE OF INTENTION TO DRILL A NON-EXEMPT WELL INSIDE THE PHOENIX ACTIVE MANAGEMENT AREA HAS BEEN GRANTED TO:

WELL OWNER: FLORENCE COOPER, INC. 1575 W HUNT HWY FLORENCE, AZ 85132

The well(s) is/are to be located in the:

SW¼ of the NE¼ of the SW¼ of Section 28, Township 4 South, Range 9 East

No. of well(s) in this project: 1

THIS AUTHORIZATION EXPIRES AT MIDNIGHT ON THE 22TH DAY OF AUGUST, 2018.

Stella Murillo

GROUNDWATER PERMITTING AND WELLS UNIT

THE DRILLER MUST FILE A LOG OF THE WELL WITHIN 30 DAYS OF COMPLETION OF DRILLING

DOUGLAS A. DUCEY
Governor

THOMAS BUSCHATZKE
Director

ARIZONA DEPARTMENT of WATER RESOURCES
1110 W. Washington St., Suite 310
Phoenix, Arizona 85007-2952
602.771.8500
azwater.gov

September 1, 2017

Ian Ream
Florence Copper, Inc.
1575 W. Hunt Hwy
Florence, AZ 85132

RE: Notice of Intention to Modify an Existing Non-Exempt Well
Well Registration No. 55-227700 thru 55-227708
File No. D (4-9) 28 CCA & CCD

Dear Mr. Ream:

The Notice of Intention to Modify an Existing Non-Exempt Well inside the Pinal Active Management Area has been approved. A copy of the Notice is enclosed for your records. The drilling card for the modification of the above referenced well has been forwarded to your well driller.

Within 30 days of completion of the well, the well driller is required to furnish this Department with a complete and accurate log of the well. In addition, the well owner is required to submit the enclosed Completion Report within 30 days of installation of pump equipment.

Pursuant to the provisions of A.R.S. § 45-604, any person withdrawing groundwater from a well is required to use a water measuring device to record rates of withdrawal in order to provide or allow the computation of an annual volume of pumpage from the well. The total volume of pumpage shall be reported on an annual report. The annual report shall be submitted no later than March 31 following the end of each completed annual reporting period. The first annual report period shall be from the date of this permit through December 31, 2017.

The Department has issued the authorization to modify this well pursuant to A.R.S. §§ 45-596 and 45-597 of the Groundwater Code. The legal nature of the water withdrawn from the well may be the

subject of court action in the future as part of a determination of surface water rights in your area. If there are court proceedings that could affect your well, you will be notified and be given the opportunity to participate.

Under A.R.S. § 45-593, the person to whom a well is registered must notify the Department of a change in ownership, physical characteristics or any other data about the well in order to keep the well registration records current and accurate. Forms may be obtained by contacting the Department, or online at http://www.azwater.gov

If you have any questions about the terms and conditions of the permit or require any administrative corrections to this permit, please contact the Groundwater Permitting Wells Unit at (602) 771-8527.

Sincerely,

Stella Murillo

Stella Murillo, Manager
Groundwater Permitting and Wells Section

Enclosures

R-05

ARIZONA DEPARTMENT OF WATER RESOURCES
GROUNDWATER PERMITTING AND WELLS UNIT
MAIL TO: P.O. BOX 36020, PHOENIX, ARIZONA 85067-6020
1110 W. Washington St. Suite 310, Phoenix, Arizona 85007-2952
Phone (602) 771-8527 Fax (602) 771-8590

RECEIVED
AUG 21 2017
ARIZONA DEPARTMENT OF WATER RESOURCES

NOTICE OF INTENTION TO DRILL A NON-EXEMPT WELL PURSUANT TO A GROUNDWATER WITHDRAWAL PERMIT (OTHER THAN A GENERAL INDUSTRIAL USE PERMIT) IN AN ACTIVE MANAGEMENT AREA

PLEASE READ GENERAL INSTRUCTIONS AND CONDITIONS ON REVERSE SIDE OF THIS FORM BEFORE COMPLETING.
Section § 45-598, Arizona Revised Statutes provides: In an Active Management Area, prior to drilling a well, a person entitled to withdraw groundwater shall file a Notice of Intention to Drill with the Department. Pursuant to A.R.S. § 45-596 and A.A.C. R12-15-104, the filing fee for this application is $150.00.

1. **WELL/LAND LOCATION:**
   4S (Township) N/S 9E (Range) E/W 28 (Section)
   SW (10 Acre) ¼ NE (40 Acre) ¼ SW (160 Acre) ¼

2. **POSITION LOCATION OF THE WELL:**
   Latitude 33 ° 3 '0.68" N
   Longitude 111 ° 26 '3.04" W

3. **COUNTY** Pinal

4. **APPLICANT**
   Florence Copper, Inc. (Name)
   1575 W Hunt Hwy (Mailing Address)
   Florence (City) AZ (State) 85132 (Zip)
   Telephone No. 520-374-3984

5. **OWNER OF THE LAND OF WELLSITE:**
   AZ State Land (Mineral Lease #11-026500) (Name)
   1616 W Adams Street (Mailing Address)
   Phoenix (City) AZ (State) 85007 (Zip)
   Telephone No. 602-542-4631

6. **THIS NOTICE IS FILED BY:**
   Check one: ☐ Owner ☒ Lessee
   Ian Ream (Name)
   1575 W Hunt Hwy (Mailing Address)
   Florence (City) AZ (State) 85132 (Zip)

7. **DESCRIPTION OF THE PROPOSEDWELL:**
   Diameter 5 Inches
   Depth 1200 Feet
   Type of Casing Steel/FRP/PVC

8. **ESTIMATE OF TOTAL ANNUAL PUMPAGE:**
   48.5 Acre-feet per Year

9. **PRINCIPAL USE OF WATER** (be specific):
   Mineral Extraction

10. **OTHER USES INTENDED** (be specific):
    None

11. **CONSTRUCTION WILL START:**
    September (Month) 2017 (Year)

FOR DEPARTMENT USE ONLY
File No. D(4-9)28 CAC
Filed 8-21-17 By SM
Input " By "

DUPLICATE
Mailed ____ By ____
Registration 55- 227702
AMA/INA PINAL

12. **CLAIM OF ENTITLEMENT TO WITHDRAW GROUNDWATER:**
    Permit 59- 562120.0005

13. **DRILLING FIRM:**
    HydroResources (Name)
    13027 County Rd 18, Unit C (Mailing Address)
    Fort Lupton (City) CO (State) 80621 (Zip)
    303-857-7540 (Telephone No.)
    816 (DWR License Number)
    A-4 (ROC License Category)

14. **Is the proposed well within 100 feet of a septic tank system, sewage area, landfill, hazardous waste facility or storage area of hazardous material or a petroleum storage area and tank?** ☐ Yes ☒ No

15. **Attach a detailed construction diagram of the proposed well design. The diagram should provide verification of consistency with minimum construction requirements. Specifically, the diagram should include an indication of the perforated interval location(s) in relationship to the expected water level; the depth and thickness of the surface seal, and grouting material used; whether the surface or conductor casing will extend above grade; and vault details, if specified.**

I state that this Notice is filed in compliance with Rules A.A.C. R12-15-809 and R12-15-816(F), and is complete and correct to the best of my knowledge and belief, and that I understand the conditions set forth on the reverse side of this form.

Ian Ream (Type or Print Name and) — Signature ☐ Land Owner ☒ Lessee of well site — Senior Hydrogeologist (Title) — 8-17-2017 (Date)

ARIZONA DEPARTMENT OF WATER RESOURCES

GROUNDWATER PERMITTING AND WELLS UNIT
1110 W. Washington St. Suite 310, Phoenix, Arizona 85007-2952
Phone (602) 771-8585 Fax (602) 771-8688

WELL CONSTRUCTION SUPPLEMENT (form DWR 55-90)

Well Registration Number 55- 227702

1. **Well Location:**

   SW (10AC) ¼ of the NE (40AC) ¼ of the SW (160AC) ¼, Sec. 28, Township 4S Range 9E.

2. **Position Location of the Well:**

   Latitude 33 ° 3 ' 0.68 " **Longitude** 111 ° 26 ' 3.04 "

   Datum: ✓ **NAD 83** • **NAD 27** • **Other:** _____

3. **County** PINAL.

4. **Date construction to start:** SEPTEMBER 2017.

5. **Time period well will remain in use:** 5 YEARS.

6. **Is pump equipment to be installed?** YES **If so, design pump capacity:** 30 **GPM.**

7. **Well construction plan:**

   a. **Drilling method (mud rotary, hollow-stem auger, etc.)** MUD ROTARY.

   b. **Borehole diameters** 30 (20) **inches from** 0 (20) **feet to** 20 (490) **feet.**
   12.25 **inches from** 490 **feet to** 1210 **feet.**

   c. **Casing materials** STEEL/FIBERGLASS REINFORCED PLASTIC/ PVC.

   d. **Method of well development (bail, air lift, surge, etc.)** AIR LIFT, SURGE.

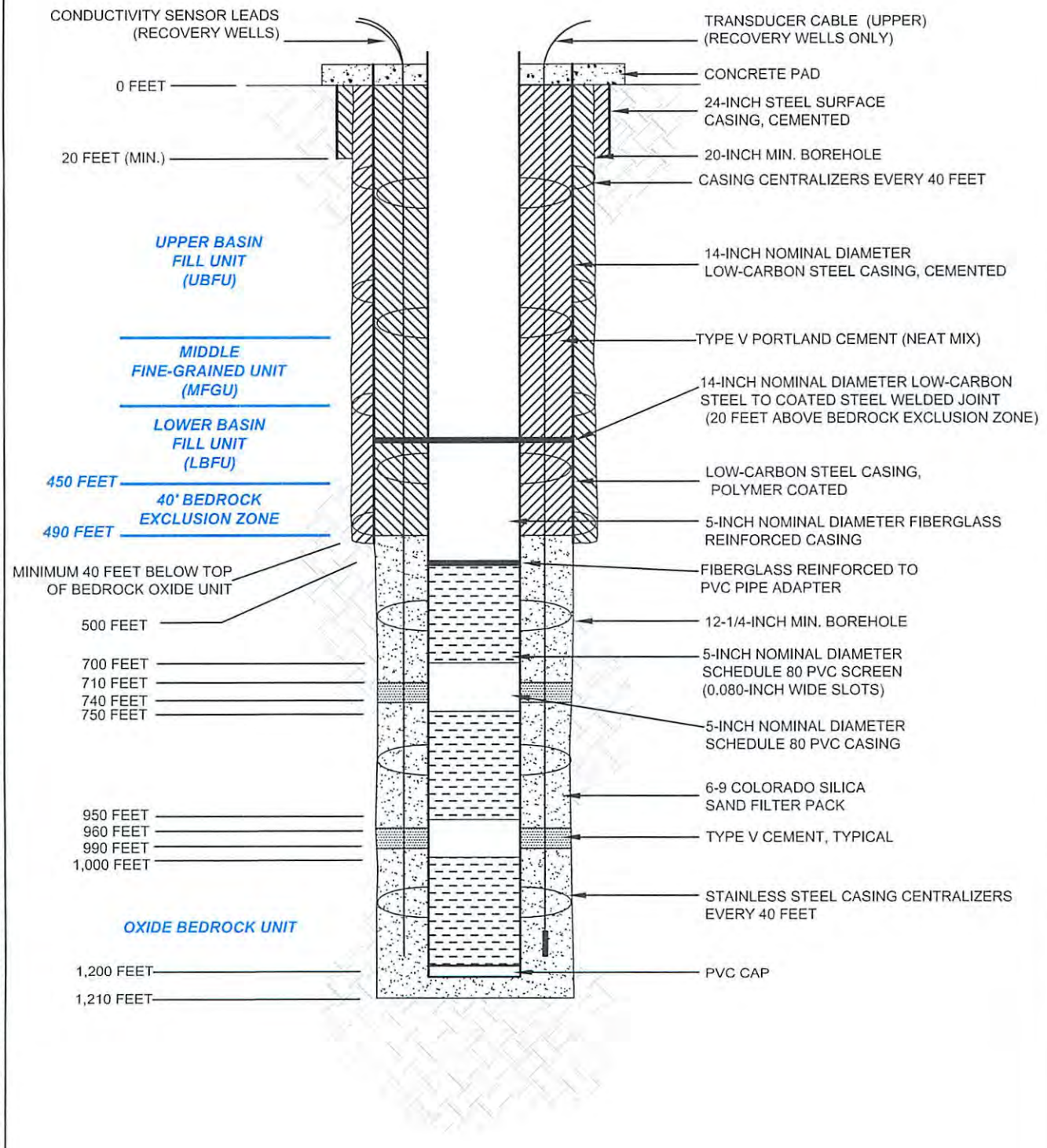
   e. **Will surface or conductor casing extend above grade?** NO.

8. **Include a detailed construction diagram of the proposed well design. The diagram should verify consistency with minimum construction requirements specified in the Department's well construction rules found in Arizona Administrative Code (A.A.C.) R12-15-801 *et seq.* Specifically, the diagram should include borehole diameters; casing materials and diameters; perforation intervals; the expected water level; depth and thickness of the surface seal; proposed grouting materials; and the length that the surface or conductor casing will extend above grade, or vault details, if specified.**

   Pursuant to Arizona Revised Statutes (A.R.S.) § 45-594.B, all well construction, replacement, deepening and abandonment operations shall comply with the rules adopted pursuant to this section. Therefore, any existing well that is deepened or modified must be brought into compliance with minimum well construction standards specified above, if not already in compliance.

9. **Proposed materials and method of abandonment if well is to be abandoned after project is completed (Minimum requirements per A.A.C. R12-15-816):**

_____



G:\PROJECTS\CURIS RESOURCES\38706-CURIS FEASIBILITY\DRAWINGS\2014 UIC APP\FIGURES MM-1 WELL CONST DGRM JUNE2015 UPDATE.DWG

HALEY ALDRICH

FLORENCE COPPER, INC.
FLORENCE, ARIZONA

R-03
WELL CONSTRUCTION DIAGRAM

FLORENCE COPPER INC.

SCALE: NOT TO SCALE

FIGURE 1

10. Is the proposed wellsite within 100 feet of a septic tank system, sewage disposal area, landfill, hazardous waste facility, storage area of hazardous material, or petroleum storage area or tank? _____Yes __X__No

11. Is this well to monitor existing contamination? ____Yes __X__No

Potential contamination?_____Yes __X__No If yes, please provide explanation:_____

_____

12. Name of Consulting firm, if any: HALEY & ALDRICH, INC.

400 E VAN BUREN STREET SUITE 545	PHOENIX	AZ	85004
Address	**City**	**State**	**Zip**

Contact Person: LAUREN CANDREVA Telephone Number: 602-760-2429

13. Drilling firm HYDRORESOURCES

DWR License Number: 816 ROC License Category: A-4

14. Special construction standards, if any, required pursuant to A.A.C. R12-15-821:_____

_____

I (we), Ian Reavis (print name) hereby affirm that all information provided in this application is true and correct to the best of my/our knowledge and belief.

Signature of Applicant _____ Date 4-17-2017

Memorandum

To: Stella Murillo, Groundwater Permitting and Wells
From: Phil Whitmore, Groundwater Permitting and Wells
CC: Jeff Tannler, Statewide AMA Director
Date: 8/29/2017
Subject: Review of Application for a Permit to Drill or Operate Nine Non-exempt Wells within an Active Management Area
59-562120 55-227700-08 D(4-9)CAC & CBD
Florence Copper, Inc.

ADWR has reviewed the above-referenced applications for nine (9) permits to drill and operate a non-exempt well in the Pinal AMA. This hydrologist review is limited to conformance with well construction standards only.

The applicant proposes to withdraw 48.5 acre-feet per year from 8 of the new wells and 97 acre-feet per year from one well pursuant to the applicant's Mineral Extraction Withdrawal permit (59-562120.0005).

Well Construction

The applicant proposes that all nine (9) wells will be drilled and constructed in the same manner and drill depths. Each well will be 1210 feet deep with three (3) 200-foot screen intervals all open in the bedrock aquifer only. Eight of wells will have 5-inch and one will have 8-inch diameter inner casing constructed with PVC and include elements to reduce chemical corrosion.

The applications each included proposed well construction diagrams indicating that the outer annulus of the wells will be sealed from the surface to 20 feet below land surface and an inner annulus will be sealed to 490 below land surface. The estimated contact of the lower basin fill unit and the crystalline bedrock is approximately 490 feet deep.

The well diagrams did not indicate the height of well stick up and the applicant did not include a request for variance. However, if stick up is to be less than 1 foot above land surface a request for variance should be submitted to comply with Arizona Administrative Code R12-15-820.

Conclusion

We recommend issuing a permit to drill and operate all nine (9) non-exempt wells in the proposed location, at the volume and well construction specifications stated in the application.

Printed: 8/21/2017 4:01:07 PM

Arizona Department of Water Resources

1110 West Washington Street, Suite 310
Phoenix AZ 85007

Customer:
LINDA DOMBROWSKI
70 BLANCHARD ROAD
BURLINGTON, MA 01803

Receipt #: 18-53410
Office: MAIN OFFICE
Receipt Date: 08/21/2017
Sale Type: IN_PERSON
Cashier: WRSAM

Item No.	Function Code	AOBJ	Description	Ref ID	Qty	Unit Price	Ext Price
67491	122221	4439-TT	Permit to drill non-exempt well in an active management area	227702	1	150.00	150.00
					RECEIPT TOTAL:		**150.00**

Payment type: CREDIT CARD
Amount Paid: $150.00
Payment Received Date: 08/21/2017

Authorization 189991565

Notes: FROM TTA.

No refund without valid receipt

APPENDIX B

Lithologic Log

HALEY ALDRICH

LITHOLOGIC LOG

R-03

Project	Production Test Facility, Florence, Arizona	File No. 129687
Client	Florence Copper, Inc.	Sheet No. 1 of 15
Contractor	Cascade Drilling LLC	Cadastral Location D (4-9) 28 CAC

Drilling Method	Reverse Rotary	Land Surface Elevation	1478.80 feet, amsl	Start	30 November 2017
Borehole Diameter(s)	30/20/12.25 in.	Datum	State Plane NAD 83	Finish	12 January 2018
Rig Make & Model	Midway 3500	Location	N 746,132 E 847,836	H&A Rep.	C. Giusti

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION	COMMENTS
0		SM		**SILTY SAND**(0-24 feet) Primarily fine sand with ~20% fines and ~10% gravel up to 150 mm. Sand is subangular to subrounded, gravel is subangular to rounded. Fines have low plasticity, have no toughness, no dry strength, and are red brown (7.5YR 4/3). **UBFU**	
5	1475				**Well Registry ID:** 55-227702 **Surface Completion:** Bolted Sealed Well Flange **Well casing stickup:** 1.98 feet als *COLOR IDENTIFICATION MADE WITH WET SAMPLES USING MUNSELL CHART*
10	1470				
15	1465				
20	1460				
25	1455	SW-SM	24	**WELL GRADED SAND with SILT AND GRAVEL**(24-41 feet) Primarily fine to coarse sand with ~10% fines and ~20% gravel up to 200 mm. Sand is subangular to subrounded and gravel is subangular to rounded. Fines have low plasticity, have no toughness, no dry strength, and are red brown (7.5YR 4/3). **UBFU**	
30	1450				
35	1445				
40	1440	SM	41	**SILTY SAND (41-46 feet)** Primarily fine sand with ~30% fines and ~5% gravels up to 22 mm. Sand is subangular to subrounded and gravels are subangular to rounded. Fines have low plasticity, have no toughness, no dry strength, and are red brown (7.5YR 4/3). **UBFU**	**Surface Casing:** 24-inch mild steel; 0 - 40 feet **Overburden Casing:** 14-inch mild steel; 0 - 494 feet **Well Casing:** Nominal 5-inch diameter Fiberglass Reinforced; -1.98 - 522 feet
45	1435	SP	46	**POORLY GRADED SAND with GRAVEL (46-60 feet)** Primarily coarse sand with ~5% fines and ~20% gravels up to 54 mm. Sands and gravels are subangular to subrounded. Fines have low plasticity, have no toughness, no dry strength, are reddish brown (5YR 5/4), and weak reaction to HCL. **UBFU**	
50	1430				
55	1425				
60	1420	CL	60	SANDY LEAN CLAY **(60-70 feet)** Primarily fines with ~35% sand and ~5% gravel up to 14 mm. Sands and gravels are subangular to rounded. Fines have medium plasticity, medium toughness, no dry strength, are reddish brown (5YR 5/4), and weak reaction to HCL. **UBFU**	**Unit Intervals:** UBFU: 0 - 281 feet MGFU: 281 - 302 feet LBFU: 302 - 422 feet Oxide Bedrock: 422 - 1225 feet
65	1415				
70	1410	SW-SC	70	**WELL GRADED SAND with CLAY (70-90 feet)** Primarily fine to coarse sands with ~20% fines and ~10% gravels up to 20 mm. Sands are subangular to rounded, gravels are subangular to subrounded. Fines have low plasticity, low toughness, no dry strength, are light brown (7.5YR 6/4), and weak reaction to HCL. **UBFU**	
75	1405				

NOTE: Lithologic descrptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

R-03

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION	
75					
80	1400				
85	1395				
90	1390	CL	90	**SANDY LEAN CLAY (90-100 feet)** Primarily fines with ~35% sand and ~5% gravels up to 13 mm. Sands are subangular to subrounded and gravels are subangular to rounded. Fines have medium plasticity, medium toughness, medium dry strength, are reddish brown (5YR 5/4), and weak reaction to HCL. **UBFU**	
95	1385				
100	1380	SC	100	**CLAYEY SAND with GRAVEL (100-105 feet)** Primarily fine to coarse sand with ~30% fines and ~15% gravels up to 10 mm. Sands and gravels are subangular to subrounded. Fines have medium plasticity, low toughness, medium dry strength, are light brown (7.5YR 6/4), and strong reaction to HCL. **UBFU**	**Seal:** Type V neat cement 0 - 494 feet Fine sand/bentonite 494 - 511 feet
105	1375	CL	105	**LEAN CLAY with SAND (105-145 feet)** Primarily fines with ~20% sand and ~5% gravels up to 15 mm. Sands are subangular to rounded and gravels are subangular to subrounded. Fines have medium plasticity, medium toughness, medium dry strength, are reddish brown (5YR 5/4), and strong reaction to HCL. **UBFU**	
110	1370				
115	1365				
120	1360				
125	1355				
130	1350				
135	1345				
140	1340				
145	1335	CL	145	**SANDY LEAN CLAY (145-165 feet)** Primarily fines with ~30% sand and ~10% gravels up to 20 mm. Sands are subangular to rounded and gravels are subangular to subrounded. Fines have medium plasticity, medium toughness, low dry strength, are reddish brown (5YR 4/4), and weak reaction to HCL. **UBFU**	
150	1330				
155	1325				
160	1320				

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
165	1315	SC	165	**CLAYEY SAND with GRAVEL (165-210 feet)** Primarily fine to coarse sand with ~20% fines and ~15% gravels up to 40 mm. Sands are subangular to subrounded and gravels are angular to subrounded. Fines have low plasticity, low toughness, low dry strength, are light brown (7.5YR 6/4), and weak reaction to HCL. **UBFU**
210	1270	SW-SC	210	**WELL GRADED SAND with CLAY (210-230 feet)** Primarily fine to coarse sands with ~30% fines and ~5% gravels up to 15 mm. Sands and gravels are subangular to subrounded. Fines have low plasticity, low toughness, low dry strength, are light brown (7.5YR 6/3), and weak reaction to HCL. **UBFU**
230	1250	SP	230	**POORLY GRADED SAND with GRAVEL (230-255 feet)** Primarily coarse sands with trace fines and ~25% gravels up to 25 mm. Sands are angular to subrounded and gravels are subangular to subrounded. Fines are reddish brown (7.5YR 5/4) and strong reaction to HCL. **UBFU**
245	1235			

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
250	1230			
255	1225	SW	255	**WELL GRADED SAND (255-281 feet)** Primarily fine to coarse sands with trace fines and ~10% gravels up to 8 mm. Sands are angular to subrounded and gravels are subangular to subrounded. Fines are nonplastic, have no toughness, no dry strength, are reddish brown (7.5YR 5/4) and weak cementation. **UBFU**
260	1220			
265	1215			
270	1210			
275	1205			
280	1200	CH	281	**FAT CLAY (281-302 feet)** Primarily fines with ~15% sand and ~5% gravels up to 18 mm. Sands are angular to subrounded and gravels are subangular to subrounded. Fines have high plasticity, high toughness, high dry strength, reddish brown (5YR 4/4), and weak reaction to HCL. **MFGU**
285	1195			
290	1190			
295	1185			
300	1180	SP-SC	302	**POORLY GRADED SAND with CLAY and GRAVEL (302-340 feet)** Primarily coarse to medium sands with ~10% fines and ~20% gravels up to 19 mm. Sands are angular to subrounded and gravels are subangular to subrounded. Fines have high plasticity, high toughness, high dry strength, are reddish brown (5YR 4/4), and weak reaction to HCL. **LBFU**
305	1175			
310	1170			
315	1165			
320	1160			
325	1155			
330	1150			
335	1145			

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
340	1140	SW	340	**WELL GRADED SAND (340-422 feet)** Primarily fine to coarse sands with ~5% fines and ~10% gravels up to 16 mm. Sands are angular to subrounded and gravels are subangular to subrounded. Fines have low plasticity, low toughness, low dry strength, are reddish brown (7.5YR 5/4), and weak cementation. **LBFU**
345	1135			
350	1130			
355	1125			
360	1120			
365	1115			
370	1110			
375	1105			
380	1100			
385	1095			
390	1090			
395	1085			
400	1080			
405	1075			
410	1070			
415	1065			
420	1060			
			422	

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
425	1055			**QUARTZ MONZONITE (422-845 feet)**
430	1050			Consists of quartz at approximately 35%, potassium feldspars at approximately 35%, plagioclase at approximately 25%, and biotite at approximately 5%.
435	1045			Cu minerals at 465 and 820-845.
440	1040			
445	1035			
450	1030			
455	1025			
460	1020			
465	1015			
470	1010			
475	1005			
480	1000			
485	995			
490	990			
495	985			
500	980			
505	975			
	970			

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION	
510			509	**QUARTZ MONZONITE (422-845 feet)** Continued	**Filter Pack:** No. 60 Silica Sand 511 - 644, 657 - 886, 897 - 1225 feet **Fine Sand Intervals:** 644 - 657, 886 - 897 feet **Thread Adapter:** Stainless Steel, SCH 80 F480 PVC to API; 522 feet
515	965				
520	960				
525	955				
530	950				**Well Screen:** Nominal 5-inch diameter, SCH 80 PVC Screen (0.080-inch slots); 522 - 642, 662 - 882, 902 - 1203 feet **ERT Sensor Depths:** 512, 572, 632, 692, 752, 812, 872, 932, 992, 1032, 1092, 1172 feet
535	945				
540	940				
545	935				
550	930				
555	925				
560	920				
565	915				
570	910				
575	905				
580	900				
585	895				
590	890				
595	885				

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
			596	**QUARTZ MONZONITE (422-845 feet)** Continued
600	880			
605	875			
610	870			
615	865			
620	860			
625	855			
630	850			
635	845			
640	840			
645	835			
650	830			
655	825			
660	820			
665	815			
670	810			
675	805			
680	800			
			682	

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
685	795			**QUARTZ MONZONITE (422-845 feet)**
				Continued
690	790			
695	785			
700	780			
705	775			
710	770			
715	765			
720	760			
725	755			
730	750			
735	745			
740	740			
745	735			
750	730			
755	725			
760	720			
765	715			
	710		769	

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
770				**QUARTZ MONZONITE (422-845 feet)** Continued
775	705			
780	700			
785	695			
790	690			
795	685			
800	680			
805	675			
810	670			
815	665			
820	660			
825	655			
830	650			
835	645			
840	640			
845	635		845	**DIABASE (845-860 feet)** Dark gray to black igneous rock.
850	630			
855	625			

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
860	620		860	**QUARTZ MONZONITE (860-1025 feet)** Consists of quartz at approximately 35%, potassium feldspars at approximately 35%, plagioclase at approximately 25%, and biotite at approximately 5%.
865	615			
870	610			
875	605			
880	600			
885	595			
890	590			
895	585			
900	580			
905	575			
910	570			
915	565			
920	560			
925	555			
930	550			
935	545			
940	540		943	

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
945	535			**QUARTZ MONZONITE (860-1025 feet)** Continued
950	530			
955	525			
960	520			
965	515			
970	510			
975	505			
980	500			
985	495			
990	490			
995	485			
1000	480			
1005	475			
1010	470			
1015	465			
1020	460			
1025	455		1025	**GRANODIORITE (1025-1075 feet)** Contains mostly plagioclase in a gray aphanitic matrix with biotite crystals composing approximately 10%.
	450			

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
1030	445		1030	**GRANODIORITE (1025-1075 feet)** Continued
1035	440			
1040	435			
1045	430			
1050	425			
1055	420			
1060	415			
1065	410			
1070	405			
1075	400		1075	**QUARTZ MONZONITE (1075-1220 feet)** Consists of quartz at approximately 35%, potassium feldspars at approximately 35%, plagioclase at approximately 25%, and biotite at approximately 5%.
1080	395			
1085	390			
1090	385			
1095	380			
1100	375			
1105	370			
1110	365			
1115				

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
			1117	**QUARTZ MONZONITE (1075-1220 feet)**
1120	360			Continued
1125	355			
1130	350			
1135	345			
1140	340			
1145	335			
1150	330			
1155	325			
1160	320			
1165	315			
1170	310			
1175	305			
1180	300			
1185	295			
1190	290			
1195	285			
1200	280			

HALEY ALDRICH

LITHOLOGIC LOG

R-03

File No. 129687
Sheet No. 15 of 15

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION	
1205	275		1204	**QUARTZ MONZONITE (1075-1225 feet)** Continued	
1210	270				
1215	265				
1220	260				
1225	255		1225		**Total Borehole Depth:** Driller = 1225 feet; Geophysical Logging = 1198 feet

NOTE: Lithologic descrptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

APPENDIX C

Chemical Characteristics of Formation Water

May 23, 2018

Barbara Sylvester
Brown & Caldwell
201 E. Washington Suite 500
Phoenix, AZ 85004

TEL (602) 567-3894
FAX -

Work Order No.: 18D0619
Order Name: Florence Copper

RE: PTF

Dear Barbara Sylvester,

Turner Laboratories, Inc. received 2 sample(s) on 04/25/2018 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066

Kevin Brim
Project Manager

Client: Brown & Caldwell
Project: PTF
Work Order: 18D0619
Date Received: 04/25/2018

Order: Florence Copper

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
18D0619-01	R-09	Ground Water	04/23/2018 1555
18D0619-02	TB	Ground Water	04/25/2018 0000

Client: Brown & Caldwell
Project: PTF
Work Order: 18D0619
Date Received: 04/25/2018

Case Narrative

The 8015D analysis was performed by TestAmerica Laboratories, Inc. in Phoenix, AZ.

The radiochemistry analysis was performed by Radiation Safety Engineering, Inc. in Chandler, AZ.

D5	Minimum Reporting Limit (MRL) is adjusted due to sample dilution; analyte was non-detect in the sample.
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND	Not Detected at or above the PQL
PQL	Practical Quantitation Limit
DF	Dilution Factor
PRL	Project Reporting Limit

Turner Laboratories, Inc.

Date: 05/23/2018

Client: Brown & Caldwell
Project: PTF
Work Order: 18D0619
Lab Sample ID: 18D0619-01

Client Sample ID: R-09
Collection Date/Time: 04/23/2018 1555
Matrix: Ground Water
Order Name: Florence Copper

Analyses	Result	PRL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
ICP Dissolved Metals-E 200.7 (4.4)									
Calcium	140		4.0	M3	mg/L	1	04/27/2018 1440	05/04/2018 1150	MH
Iron	ND		0.30		mg/L	1	04/27/2018 1440	05/04/2018 1150	MH
Magnesium	27		3.0		mg/L	1	04/27/2018 1440	05/04/2018 1150	MH
Potassium	6.8		5.0		mg/L	1	04/27/2018 1440	05/04/2018 1150	MH
Sodium	170		5.0	M3	mg/L	1	04/27/2018 1440	05/04/2018 1150	MH
ICP/MS Dissolved Metals-E 200.8 (5.4)									
Aluminum	ND		0.0800	D5	mg/L	2	04/27/2018 1440	05/07/2018 1139	MH
Antimony	ND		0.00050		mg/L	1	04/27/2018 1440	05/07/2018 1133	MH
Arsenic	0.0016		0.00050		mg/L	1	04/27/2018 1440	05/07/2018 1133	MH
Barium	0.071		0.00050		mg/L	1	04/27/2018 1440	05/07/2018 1133	MH
Beryllium	ND		0.00050	D5	mg/L	2	04/27/2018 1440	05/07/2018 1139	MH
Cadmium	ND		0.00025		mg/L	1	04/27/2018 1440	05/07/2018 1133	MH
Chromium	0.0051		0.00050		mg/L	1	04/27/2018 1440	05/07/2018 1133	MH
Cobalt	ND		0.00025		mg/L	1	04/27/2018 1440	05/07/2018 1133	MH
Copper	0.011		0.00050		mg/L	1	04/27/2018 1440	05/07/2018 1133	MH
Lead	ND		0.00050		mg/L	1	04/27/2018 1440	05/07/2018 1133	MH
Manganese	0.0020		0.00025		mg/L	1	04/27/2018 1440	05/07/2018 1133	MH
Nickel	0.0033		0.00050		mg/L	1	04/27/2018 1440	05/07/2018 1133	MH
Selenium	ND		0.0025		mg/L	1	04/27/2018 1440	05/07/2018 1133	MH
Thallium	ND		0.00050		mg/L	1	04/27/2018 1440	05/07/2018 1133	MH
Zinc	ND		0.040		mg/L	1	04/27/2018 1440	05/07/2018 1133	MH
CVAA Dissolved Mercury-E 245.1									
Mercury	ND		0.0010		mg/L	1	04/26/2018 0955	04/26/2018 1639	MH
pH-E150.1									
pH (pH Units)	7.8			H5	-	1	04/26/2018 1615	04/26/2018 1616	AP
Temperature (°C)	22			H5	-	1	04/26/2018 1615	04/26/2018 1616	AP
ICP/MS Total Metals-E200.8 (5.4)									
Uranium	0.016		0.00050		mg/L	1	04/27/2018 1230	04/30/2018 1348	MH

Client: Brown & Caldwell
Project: PTF
Work Order: 18D0619
Lab Sample ID: 18D0619-01

Client Sample ID: R-09
Collection Date/Time: 04/23/2018 1555
Matrix: Ground Water
Order Name: Florence Copper

Analyses	Result	PRL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300.0 (2.1)									
Chloride	310		25		mg/L	25	04/26/2018 1225	04/26/2018 1415	AP
Fluoride	ND		0.50		mg/L	1	04/25/2018 1208	04/25/2018 1544	AP
Nitrogen, Nitrate (As N)	8.8		0.50		mg/L	1	04/25/2018 1208	04/25/2018 1544	AP
Nitrogen, Nitrite (As N)	ND		0.10		mg/L	1	04/25/2018 1208	04/25/2018 1544	AP
Sulfate	190		130		mg/L	25	04/26/2018 1225	04/26/2018 1415	AP
Cyanide-E335.4									
Cyanide	ND		0.10		mg/L	1	04/26/2018 0845	04/30/2018 1545	AP
Alkalinity-SM2320B									
Alkalinity, Bicarbonate (As CaCO3)	150		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
Alkalinity, Carbonate (As CaCO3)	ND		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
Alkalinity, Hydroxide (As CaCO3)	ND		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
Alkalinity, Phenolphthalein (As CaCO3)	ND		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
Alkalinity, Total (As CaCO3)	150		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
Specific Conductance-SM2510 B									
Conductivity	1700		0.20		µmhos/cm	2	05/09/2018 1315	05/09/2018 1330	AP
Total Dissolved Solids (Residue, Filterable)-SM2540 C									
Total Dissolved Solids (Residue, Filterable)	1000		20		mg/L	1	04/26/2018 0826	05/01/2018 1600	EJ
Volatile Organic Compounds by GC/MS-SW8260B									
Benzene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
Carbon disulfide	ND		2.0		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
Ethylbenzene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
Toluene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
Xylenes, Total	ND		1.5		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
Surr: 4-Bromofluorobenzene	*95*	*70-130*			*%REC*	*1*	*05/07/2018 1824*	*05/07/2018 1943*	*KP*
Surr: Dibromofluoromethane	*101*	*70-130*			*%REC*	*1*	*05/07/2018 1824*	*05/07/2018 1943*	*KP*
Surr: Toluene-d8	*77*	*70-130*			*%REC*	*1*	*05/07/2018 1824*	*05/07/2018 1943*	*KP*

Client: Brown & Caldwell
Project: PTF
Work Order: 18D0619
Lab Sample ID: 18D0619-02

Client Sample ID: TB
Collection Date/Time: 04/25/2018 0000
Matrix: Ground Water
Order Name: Florence Copper

Analyses	Result	PRL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Volatile Organic Compounds by GC/MS-SW8260B									
Benzene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
Carbon disulfide	ND		2.0		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
Ethylbenzene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
Toluene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
Xylenes, Total	ND		1.5		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
Surr: 4-Bromofluorobenzene	*101*	*70-130*			*%REC*	*1*	*05/07/2018 1824*	*05/07/2018 2344*	*KP*
Surr: Dibromofluoromethane	*110*	*70-130*			*%REC*	*1*	*05/07/2018 1824*	*05/07/2018 2344*	*KP*
Surr: Toluene-d8	*103*	*70-130*			*%REC*	*1*	*05/07/2018 1824*	*05/07/2018 2344*	*KP*

Client: Brown & Caldwell
Project: PTF
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QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1804269 - E 245.1										
Blank (1804269-BLK1)				Prepared & Analyzed: 04/26/2018						
Mercury	ND	0.0010	mg/L							
LCS (1804269-BS1)				Prepared & Analyzed: 04/26/2018						
Mercury	0.0049	0.0010	mg/L	0.005000		98	85-115			
LCS Dup (1804269-BSD1)				Prepared & Analyzed: 04/26/2018						
Mercury	0.0048	0.0010	mg/L	0.005000		95	85-115	2	20	
Matrix Spike (1804269-MS1)		**Source: 18D0394-01**		Prepared & Analyzed: 04/26/2018						
Mercury	0.0050	0.0010	mg/L	0.005000	0.00020	97	85-115			
Matrix Spike Dup (1804269-MSD1)		**Source: 18D0394-01**		Prepared & Analyzed: 04/26/2018						
Mercury	0.0050	0.0010	mg/L	0.005000	0.00020	96	85-115	1	20	
Batch 1804292 - E200.8 (5.4)										
Blank (1804292-BLK1)				Prepared & Analyzed: 04/30/2018						
Uranium	ND	0.00050	mg/L							
LCS (1804292-BS1)				Prepared & Analyzed: 04/30/2018						
Uranium	0.046	0.00050	mg/L	0.05000		92	85-115			
LCS Dup (1804292-BSD1)				Prepared & Analyzed: 04/30/2018						
Uranium	0.046	0.00050	mg/L	0.05000		92	85-115	0.2	20	
Matrix Spike (1804292-MS1)		**Source: 18D0614-01**		Prepared & Analyzed: 04/30/2018						
Uranium	0.051	0.00050	mg/L	0.05000	0.0015	99	70-130			
Batch 1805051 - E 200.7 (4.4)										
Blank (1805051-BLK1)				Prepared & Analyzed: 05/04/2018						
Calcium	ND	4.0	mg/L							
Iron	ND	0.30	mg/L							
Magnesium	ND	3.0	mg/L							
Potassium	ND	5.0	mg/L							
Sodium	ND	5.0	mg/L							
LCS (1805051-BS1)				Prepared & Analyzed: 05/04/2018						
Calcium	11	4.0	mg/L	10.00		109	85-115			
Iron	1.0	0.30	mg/L	1.000		104	85-115			
Magnesium	10	3.0	mg/L	10.00		105	85-115			
Potassium	10	5.0	mg/L	10.00		105	85-115			
Sodium	10	5.0	mg/L	10.00		105	85-115			
LCS Dup (1805051-BSD1)				Prepared & Analyzed: 05/04/2018						
Calcium	11	4.0	mg/L	10.00		110	85-115	1	20	
Iron	1.0	0.30	mg/L	1.000		105	85-115	0.5	20	
Magnesium	10	3.0	mg/L	10.00		105	85-115	0.06	20	
Potassium	10	5.0	mg/L	10.00		105	85-115	0.05	20	
Sodium	11	5.0	mg/L	10.00		109	85-115	4	20	

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QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1805051 - E 200.7 (4.4)										
Matrix Spike (1805051-MS1)	**Source: 18D0619-01**			Prepared & Analyzed: 05/04/2018						
Calcium	150	4.0	mg/L	10.00	140	59	70-130			M3
Iron	1.1	0.30	mg/L	1.000	0.028	105	70-130			
Magnesium	38	3.0	mg/L	10.00	27	108	70-130			
Potassium	17	5.0	mg/L	10.00	6.8	105	70-130			
Sodium	170	5.0	mg/L	10.00	170	30	70-130			M3
Matrix Spike (1805051-MS2)	**Source: 18E0021-01**			Prepared & Analyzed: 05/04/2018						
Calcium	64	4.0	mg/L	10.00	54	103	70-130			
Iron	1.0	0.30	mg/L	1.000	0.0060	101	70-130			
Magnesium	21	3.0	mg/L	10.00	11	99	70-130			
Potassium	15	5.0	mg/L	10.00	4.7	104	70-130			
Sodium	99	5.0	mg/L	10.00	90	87	70-130			
Batch 1805069 - E 200.8 (5.4)										
Blank (1805069-BLK1)				Prepared & Analyzed: 05/07/2018						
Aluminum	ND	0.0400	mg/L							
Antimony	ND	0.00050	mg/L							
Arsenic	ND	0.00050	mg/L							
Barium	ND	0.00050	mg/L							
Beryllium	ND	0.00025	mg/L							
Cadmium	ND	0.00025	mg/L							
Chromium	ND	0.00050	mg/L							
Cobalt	ND	0.00025	mg/L							
Copper	ND	0.00050	mg/L							
Lead	ND	0.00050	mg/L							
Manganese	ND	0.00025	mg/L							
Nickel	ND	0.00050	mg/L							
Selenium	ND	0.0025	mg/L							
Thallium	ND	0.00050	mg/L							
Zinc	ND	0.040	mg/L							
LCS (1805069-BS1)				Prepared & Analyzed: 05/07/2018						
Aluminum	0.104	0.0400	mg/L	0.1000		104	85-115			
Antimony	0.048	0.00050	mg/L	0.05000		96	85-115			
Arsenic	0.050	0.00050	mg/L	0.05000		100	85-115			
Barium	0.050	0.00050	mg/L	0.05000		100	85-115			
Beryllium	0.049	0.00025	mg/L	0.05000		97	85-115			
Cadmium	0.050	0.00025	mg/L	0.05000		100	85-115			
Chromium	0.051	0.00050	mg/L	0.05000		102	85-115			
Cobalt	0.051	0.00025	mg/L	0.05000		101	85-115			
Copper	0.051	0.00050	mg/L	0.05000		103	85-115			
Lead	0.049	0.00050	mg/L	0.05000		98	85-115			
Manganese	0.050	0.00025	mg/L	0.05000		101	85-115			
Nickel	0.051	0.00050	mg/L	0.05000		102	85-115			
Selenium	0.051	0.0025	mg/L	0.05000		103	85-115			
Thallium	0.050	0.00050	mg/L	0.05000		101	85-115			
Zinc	0.10	0.040	mg/L	0.1000		101	85-115			

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QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1805069 - E 200.8 (5.4)										
LCS Dup (1805069-BSD1)				Prepared & Analyzed: 05/07/2018						
Aluminum	0.115	0.0400	mg/L	0.1000		115	85-115	10	20	
Antimony	0.048	0.00050	mg/L	0.05000		96	85-115	0.7	20	
Arsenic	0.050	0.00050	mg/L	0.05000		101	85-115	0.8	20	
Barium	0.051	0.00050	mg/L	0.05000		102	85-115	1	20	
Beryllium	0.049	0.00025	mg/L	0.05000		97	85-115	0.2	20	
Cadmium	0.050	0.00025	mg/L	0.05000		100	85-115	0.2	20	
Chromium	0.051	0.00050	mg/L	0.05000		102	85-115	0.4	20	
Cobalt	0.050	0.00025	mg/L	0.05000		101	85-115	0.5	20	
Copper	0.052	0.00050	mg/L	0.05000		105	85-115	2	20	
Lead	0.049	0.00050	mg/L	0.05000		98	85-115	0.1	20	
Manganese	0.050	0.00025	mg/L	0.05000		101	85-115	0.09	20	
Nickel	0.051	0.00050	mg/L	0.05000		103	85-115	0.8	20	
Selenium	0.052	0.0025	mg/L	0.05000		104	85-115	2	20	
Thallium	0.050	0.00050	mg/L	0.05000		101	85-115	0.06	20	
Zinc	0.10	0.040	mg/L	0.1000		104	85-115	3	20	
Matrix Spike (1805069-MS1)		**Source: 18D0693-01**		Prepared & Analyzed: 05/07/2018						
Aluminum	0.239	0.0400	mg/L	0.1000	0.166	74	70-130			
Antimony	0.045	0.00050	mg/L	0.05000	0.00024	90	70-130			
Arsenic	0.056	0.00050	mg/L	0.05000	0.0035	104	70-130			
Barium	0.16	0.00050	mg/L	0.05000	0.12	94	70-130			
Beryllium	0.045	0.00025	mg/L	0.05000	0.000029	90	70-130			
Cadmium	0.047	0.00025	mg/L	0.05000	ND	94	70-130			
Chromium	0.049	0.00050	mg/L	0.05000	0.00052	98	70-130			
Cobalt	0.048	0.00025	mg/L	0.05000	0.00097	95	70-130			
Copper	0.051	0.00050	mg/L	0.05000	0.0020	98	70-130			
Lead	0.047	0.00050	mg/L	0.05000	0.00016	94	70-130			
Manganese	0.054	0.00025	mg/L	0.05000	0.0075	94	70-130			
Nickel	0.049	0.00050	mg/L	0.05000	0.0018	94	70-130			
Selenium	0.057	0.0025	mg/L	0.05000	ND	114	70-130			
Thallium	0.048	0.00050	mg/L	0.05000	0.000038	96	70-130			
Zinc	0.11	0.040	mg/L	0.1000	ND	109	70-130			

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QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1804261 - SM2540 C										
Duplicate (1804261-DUP1)		**Source: 18D0606-01**		Prepared: 04/26/2018 Analyzed: 04/27/2018						
Total Dissolved Solids (Residue, Filterable)	630	20	mg/L		630			0.3	5	
Duplicate (1804261-DUP2)		**Source: 18D0606-02**		Prepared: 04/26/2018 Analyzed: 04/27/2018						
Total Dissolved Solids (Residue, Filterable)	610	20	mg/L		620			0.8	5	
Batch 1804268 - E335.4										
Blank (1804268-BLK1)				Prepared: 04/26/2018 Analyzed: 04/30/2018						
Cyanide	ND	0.10	mg/L							
LCS (1804268-BS1)				Prepared: 04/26/2018 Analyzed: 04/30/2018						
Cyanide	2.0	0.10	mg/L	2.000		101	90-110			
LCS Dup (1804268-BSD1)				Prepared: 04/26/2018 Analyzed: 04/30/2018						
Cyanide	2.0	0.10	mg/L	2.000		101	90-110	0.1	20	
Matrix Spike (1804268-MS1)		**Source: 18D0602-03**		Prepared: 04/26/2018 Analyzed: 04/30/2018						
Cyanide	2.1	0.10	mg/L	2.000	ND	103	90-110			
Matrix Spike Dup (1804268-MSD1)		**Source: 18D0602-03**		Prepared: 04/26/2018 Analyzed: 04/30/2018						
Cyanide	2.0	0.10	mg/L	2.000	ND	98	90-110	5	20	
Batch 1804272 - E150.1										
Duplicate (1804272-DUP1)		**Source: 18D0662-02**		Prepared & Analyzed: 04/26/2018						
pH (pH Units)	7.8		-		7.8			0.1	200	H5
Temperature (°C)	21		-		21			2	200	H5
Batch 1805027 - SM2320B										
LCS (1805027-BS1)				Prepared & Analyzed: 05/03/2018						
Alkalinity, Total (As CaCO3)	240	2.0	mg/L	250.0		96	90-110			
LCS Dup (1805027-BSD1)				Prepared & Analyzed: 05/03/2018						
Alkalinity, Total (As CaCO3)	240	2.0	mg/L	250.0		96	90-110	0	10	
Matrix Spike (1805027-MS1)		**Source: 18D0606-02**		Prepared & Analyzed: 05/03/2018						
Alkalinity, Total (As CaCO3)	370	2.0	mg/L	250.0	130	96	85-115			
Matrix Spike Dup (1805027-MSD1)		**Source: 18D0606-02**		Prepared & Analyzed: 05/03/2018						
Alkalinity, Total (As CaCO3)	370	2.0	mg/L	250.0	130	95	85-115	0.5	10	
Batch 1805103 - SM2510 B										
LCS (1805103-BS1)				Prepared & Analyzed: 05/09/2018						
Conductivity	140	0.10	µmhos/cm	141.2		101	0-200			
LCS Dup (1805103-BSD1)				Prepared & Analyzed: 05/09/2018						
Conductivity	140	0.10	µmhos/cm	141.2		101	0-200	0.7	200	
Duplicate (1805103-DUP1)		**Source: 18E0192-01**		Prepared & Analyzed: 05/09/2018						
Conductivity	4.0	0.10	µmhos/cm		4.0			0	10	

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QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1805074 - SW8260B										
Blank (1805074-BLK1)				Prepared & Analyzed: 05/07/2018						
Benzene	ND	0.50	ug/L							
Carbon disulfide	ND	2.0	ug/L							
Ethylbenzene	ND	0.50	ug/L							
Toluene	ND	0.50	ug/L							
Xylenes, Total	ND	1.5	ug/L							
Surrogate: 4-Bromofluorobenzene	*25.0*		*ug/L*	*25.00*		*100*	*70-130*			
Surrogate: Dibromofluoromethane	*26.9*		*ug/L*	*25.00*		*107*	*70-130*			
Surrogate: Toluene-d8	*25.1*		*ug/L*	*25.00*		*100*	*70-130*			
LCS (1805074-BS1)				Prepared & Analyzed: 05/07/2018						
1,1-Dichloroethene	29		ug/L	25.00		114	70-130			
Benzene	27		ug/L	25.00		109	70-130			
Chlorobenzene	29		ug/L	25.00		115	70-130			
Toluene	25		ug/L	25.00		101	70-130			
Trichloroethene	26		ug/L	25.00		103	70-130			
Surrogate: 4-Bromofluorobenzene	*24.6*		*ug/L*	*25.00*		*98*	*70-130*			
Surrogate: Dibromofluoromethane	*25.6*		*ug/L*	*25.00*		*102*	*70-130*			
Surrogate: Toluene-d8	*24.8*		*ug/L*	*25.00*		*99*	*70-130*			
LCS Dup (1805074-BSD1)				Prepared & Analyzed: 05/07/2018						
1,1-Dichloroethene	27		ug/L	25.00		110	70-130	4	30	
Benzene	26		ug/L	25.00		104	70-130	5	30	
Chlorobenzene	26		ug/L	25.00		105	70-130	9	30	
Toluene	24		ug/L	25.00		96	70-130	5	30	
Trichloroethene	25		ug/L	25.00		98	70-130	4	30	
Surrogate: 4-Bromofluorobenzene	*24.4*		*ug/L*	*25.00*		*98*	*70-130*			
Surrogate: Dibromofluoromethane	*26.1*		*ug/L*	*25.00*		*104*	*70-130*			
Surrogate: Toluene-d8	*25.1*		*ug/L*	*25.00*		*100*	*70-130*			
Matrix Spike (1805074-MS1)	**Source: 18D0582-02**			Prepared & Analyzed: 05/07/2018						
1,1-Dichloroethene	27		ug/L	25.00	0.070	109	70-130			
Benzene	26		ug/L	25.00	0.020	104	70-130			
Chlorobenzene	26		ug/L	25.00	0.0	105	70-130			
Toluene	27		ug/L	25.00	3.5	95	70-130			
Trichloroethene	24		ug/L	25.00	0.040	97	70-130			
Surrogate: 4-Bromofluorobenzene	*24.4*		*ug/L*	*25.00*		*98*	*70-130*			
Surrogate: Dibromofluoromethane	*26.4*		*ug/L*	*25.00*		*106*	*70-130*			
Surrogate: Toluene-d8	*24.9*		*ug/L*	*25.00*		*100*	*70-130*			
Matrix Spike Dup (1805074-MSD1)	**Source: 18D0582-02**			Prepared & Analyzed: 05/07/2018						
1,1-Dichloroethene	27		ug/L	25.00	0.070	108	70-130	0.8	30	
Benzene	25		ug/L	25.00	0.020	101	70-130	2	30	
Chlorobenzene	26		ug/L	25.00	0.0	105	70-130	0.3	30	
Toluene	27		ug/L	25.00	3.5	95	70-130	0.1	30	
Trichloroethene	24		ug/L	25.00	0.040	95	70-130	2	30	
Surrogate: 4-Bromofluorobenzene	*24.7*		*ug/L*	*25.00*		*99*	*70-130*			
Surrogate: Dibromofluoromethane	*26.4*		*ug/L*	*25.00*		*106*	*70-130*			
Surrogate: Toluene-d8	*25.3*		*ug/L*	*25.00*		*101*	*70-130*			

Client: Brown & Caldwell
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QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch 1804245 - E300.0 (2.1)										
Blank (1804245-BLK1)				Prepared & Analyzed: 04/25/2018						
Chloride	ND	1.0	mg/L							
Fluoride	ND	0.50	mg/L							
Nitrogen, Nitrate (As N)	ND	0.50	mg/L							
Nitrogen, Nitrite (As N)	ND	0.10	mg/L							
Sulfate	ND	5.0	mg/L							
LCS (1804245-BS1)				Prepared & Analyzed: 04/25/2018						
Chloride	12	1.0	mg/L	12.50		92	90-110			
Fluoride	2.0	0.50	mg/L	2.000		101	90-110			
Nitrogen, Nitrate (As N)	4.7	0.50	mg/L	5.000		95	90-110			
Nitrogen, Nitrite (As N)	2.3	0.10	mg/L	2.500		92	90-110			
Sulfate	12	5.0	mg/L	12.50		96	90-110			
LCS Dup (1804245-BSD1)				Prepared & Analyzed: 04/25/2018						
Chloride	12	1.0	mg/L	12.50		94	90-110	2	10	
Fluoride	2.0	0.50	mg/L	2.000		101	90-110	0.4	10	
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000		98	90-110	3	10	
Nitrogen, Nitrite (As N)	2.4	0.10	mg/L	2.500		95	90-110	3	10	
Sulfate	12	5.0	mg/L	12.50		98	90-110	3	10	
Matrix Spike (1804245-MS1)		**Source: 18D0613-08**		Prepared & Analyzed: 04/25/2018						
Fluoride	3.7	0.50	mg/L	2.000	1.7	100	80-120			
Nitrogen, Nitrate (As N)	4.7	0.50	mg/L	5.000	0.22	89	80-120			
Matrix Spike (1804245-MS2)		**Source: 18D0625-01**		Prepared & Analyzed: 04/26/2018						
Nitrogen, Nitrate (As N)	5.0	0.50	mg/L	5.000	0.46	92	80-120			
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500	ND	88	80-120			
Matrix Spike (1804245-MS3)		**Source: 18D0614-01RE1**		Prepared & Analyzed: 04/26/2018						
Chloride	17		mg/L	12.50	6.4	88	80-120			
Sulfate	28		mg/L	12.50	18	85	80-120			
Matrix Spike Dup (1804245-MSD1)		**Source: 18D0613-08**		Prepared & Analyzed: 04/25/2018						
Fluoride	3.7	0.50	mg/L	2.000	1.7	100	80-120	0.4	10	
Nitrogen, Nitrate (As N)	4.7	0.50	mg/L	5.000	0.22	90	80-120	0.6	10	
Matrix Spike Dup (1804245-MSD2)		**Source: 18D0625-01**		Prepared & Analyzed: 04/26/2018						
Nitrogen, Nitrate (As N)	5.1	0.50	mg/L	5.000	0.46	92	80-120	0.2	10	
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500	ND	88	80-120	0.4	10	
Matrix Spike Dup (1804245-MSD3)		**Source: 18D0614-01RE1**		Prepared & Analyzed: 04/26/2018						
Chloride	18		mg/L	12.50	6.4	89	80-120	0.6	10	
Sulfate	29		mg/L	12.50	18	86	80-120	0.6	10	

TURNER LABORATORIES INC.
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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

TURNER WORK ORDER # 18D0619 DATE 4/23/18 PAGE 1 OF 1

PROJECT NAME: Florence Copper #
CONTACT NAME: Barb Sylvester
COMPANY NAME: Brown and Caldwell
ADDRESS: 2 N Central Ave, Suite 1600
CITY: Phoenix STATE: AZ ZIP CODE: 85004
PHONE: 602-567-3894 FAX:
SAMPLER'S SIGNATURE: [signature]

CIRCLE ANALYSIS REQUESTED AND/OR CHECK THE APPROPRIATE BOX

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX*	NUMBER OF CONTAINERS	Diss Metals - list (Field Filtered)	Total Uranium (not Filtered)	Inorganics - list	Cyanide (free)	Organics - list	G.Alpha, (RadSafety sub)	Uranium activity if G. Alpha >12	Ra226, 228, Ra-Tot (RadsSafety)	TPH-D (TestAmerica Sub)
R-09	4-23-18	1555		GW	10	X	X	X	X	X	X	X	X	X
8260 TB	4-23-18	1606		GW	1					X				
				GW										
				GW										
				GW										
				GW										
				GW										
				GW										
				GW										
				GW										
				GW										

1. RELINQUISHED BY:
Signature: [signature]
Printed Name: [illegible]
Firm: HA
Date/Time: 4-23-18 1630

2. RECEIVED BY:
Signature: UPS
Printed Name:
Firm:
Date/Time:

3. RELINQUISHED BY: UPS
Signature:
Printed Name:
Firm:
Date/Time:

4. RECEIVED BY:
Signature: [signature]
Printed Name: Joseph Catalano
Firm: TURNER LABORATORIES INC.
Date/Time: 4/23/18 1006

TURNAROUND REQUIREMENTS:
X Standard (approx10 days)*
___ Next day ___ 2 Day ___ 5 Day*
___ Email Preliminary Results To:
* Working Days

REPORT REQUIREMENTS:
X I. Routine Report
___ II. Report (includes DUP,MS,MSD, as required, may be charged as samples)
___ III. Date Validation Report (Includes All Raw Data)
Add 10% to invoice

INVOICE INFORMATION:
Account X Y ___ N ___
P.O. #
Bill to: Florence Copper

SAMPLE RECEIPT:
Total Containers
Temperature 2.2
☑ Wet Ice ☐ Blue Ice

*LEGEND
DW = DRINKING WATER
GW = GROUNDWATER
SD = SOLID
SG = SLUDGE
SL = SOIL
ST = STORMWATER
WW = WASTEWATER

SPECIAL INSTRUCTIONS/COMMENTS:
Compliance Analysis: ☐ Yes ☐ No
ADEQ Forms: ☐ Yes ☐ No
Mail ADEQ Forms: ☐ Yes ☐ No
Custody Seals ☐
Container Intact ☒
COC/Labels Agree ☒
Preservation Confirmation ☒
Appropriate Head Space ☒
Received Within Hold Time ☒

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Phoenix
4625 East Cotton Ctr Blvd
Suite 189
Phoenix, AZ 85040
Tel: (602)437-3340

TestAmerica Job ID: 550-101943-1
Client Project/Site: 18D0619

For:
Turner Laboratories, Inc.
2445 North Coyote Drive
Suite 104
Tucson, Arizona 85745

Attn: Kevin Brim

Authorized for release by:
5/16/2018 12:23:25 PM

Ken Baker, Project Manager II
(602)659-7624
ken.baker@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Definitions/Glossary

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
Q9	Insufficient sample received to meet method QC requirements.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Job ID: 550-101943-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-101943-1

Comments
No additional comments.

Receipt
The sample was received on 4/27/2018 10:50 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.8º C.

GC Semi VOA
Method(s) 8015D: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD) associated with preparation batch 550-145985 and analytical batch 550-146884. Affected samples have been added a Q9 qualifier. 18D0619-01 (550-101943-1)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
Method(s) 3510C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with 3510C.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-101943-1	18D0619-01	Water	04/23/18 15:55	04/27/18 10:50

Detection Summary

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Client Sample ID: 18D0619-01

Lab Sample ID: 550-101943-1

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
ORO (C22-C32)	0.21	Q9	0.20		mg/L	1		8015D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Client Sample ID: 18D0619-01
Date Collected: 04/23/18 15:55
Date Received: 04/27/18 10:50

Lab Sample ID: 550-101943-1
Matrix: Water

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
ORO (C22-C32)	0.21	Q9	0.20		mg/L		04/30/18 14:16	05/10/18 23:29	1
DRO (C10-C22)	ND	Q9	0.10		mg/L		04/30/18 14:16	05/10/18 23:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl (Surr)	*79*		*10 - 150*	*04/30/18 14:16*	*05/10/18 23:29*	*1*

Surrogate Summary

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Method: 8015D - Diesel Range Organics (DRO) (GC)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	OTPH (10-150)							
550-101943-1	18D0619-01	79							
LCS 550-145985/2-A	Lab Control Sample	79							
LCSD 550-145985/3-A	Lab Control Sample Dup	79							
MB 550-145985/1-A	Method Blank	65							

Surrogate Legend

OTPH = o-Terphenyl (Surr)

Method: 8015D - Diesel Range Organics (DRO) (GC)

Lab Sample ID: MB 550-145985/1-A
Matrix: Water
Analysis Batch: 146884

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 145985

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
ORO (C22-C32)	ND		0.20		mg/L		04/30/18 14:15	05/11/18 11:16	1
DRO (C10-C22)	ND		0.10		mg/L		04/30/18 14:15	05/11/18 11:16	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl (Surr)	*65*		*10 - 150*	*04/30/18 14:15*	*05/11/18 11:16*	*1*

Lab Sample ID: LCS 550-145985/2-A
Matrix: Water
Analysis Batch: 146884

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 145985

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
ORO (C22-C32)			1.60	1.59		mg/L		99	69 - 107		
DRO (C10-C22)			0.400	0.450		mg/L		113	42 - 133		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl (Surr)	*79*		*10 - 150*

Lab Sample ID: LCSD 550-145985/3-A
Matrix: Water
Analysis Batch: 146884

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 145985

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
ORO (C22-C32)			1.60	1.59		mg/L		100	69 - 107	0	20
DRO (C10-C22)			0.400	0.447		mg/L		112	42 - 133	1	22

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
o-Terphenyl (Surr)	*79*		*10 - 150*

QC Association Summary

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

GC Semi VOA

Prep Batch: 145985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-101943-1	18D0619-01	Total/NA	Water	3510C	
MB 550-145985/1-A	Method Blank	Total/NA	Water	3510C	
LCS 550-145985/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 550-145985/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	

Analysis Batch: 146884

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-101943-1	18D0619-01	Total/NA	Water	8015D	145985
MB 550-145985/1-A	Method Blank	Total/NA	Water	8015D	145985
LCS 550-145985/2-A	Lab Control Sample	Total/NA	Water	8015D	145985
LCSD 550-145985/3-A	Lab Control Sample Dup	Total/NA	Water	8015D	145985

Lab Chronicle

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Client Sample ID: 18D0619-01
Date Collected: 04/23/18 15:55
Date Received: 04/27/18 10:50

Lab Sample ID: 550-101943-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			145985	04/30/18 14:16	REM	TAL PHX
Total/NA	Analysis	8015D		1	146884	05/10/18 23:29	TC1	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Accreditation/Certification Summary

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Laboratory: TestAmerica Phoenix

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-18

Analysis Method	Prep Method	Matrix	Analyte

Method Summary

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Method	Method Description	Protocol	Laboratory
8015D	Diesel Range Organics (DRO) (GC)	SW846	TAL PHX
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL PHX

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

SUBCONTRACT ORDER

Turner Laboratories, Inc.

101943

18D0619

SENDING LABORATORY:	RECEIVING LABORATORY:
Turner Laboratories, Inc.	TestAmerica Phoenix
2445 N. Coyote Drive, Ste #104	4625 East Cotton Center Boulevard Suite 189
Tucson, AZ 85745	Phoenix, AZ 85540
Phone: 520.882.5880	Phone :(602) 437-3340
Fax: 520.882.9788	Fax:
Project Manager: Kevin Brim	Please CC Kevin Brim Kbrim@turnerlabs.com

Analysis	Expires	Laboratory ID	Comments
-01			
Sample ID: 18D0619-01 Drinking Water	**Sampled:04/23/2018 15:55**		
8015D Sub	04/30/2018 15:55		8015D DRO and ORO Paramaters Only
Containers Supplied:			

8015D Sub
o-Terphenyl
C10-C32 (Total)
C22-C32 (Oil Range Organics)
C10-C22 (Diesel Range Organics)
C6-C10 (Gasoline Range Organics)

550-101943 Chain of Custody

3,8°C UPS GR

TA-PHX

Released By	Date	Received By	Date
	4/24/18		4-27-18 1050
Released By	Date	Received By	Date

Login Sample Receipt Checklist

Client: Turner Laboratories, Inc.

Job Number: 550-101943-1

Login Number: 101943
List Number: 1
Creator: Gravlin, Andrea

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.

Radiation Safety Engineering, Inc.
3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121 (480) 897-9459
Website: www.radsafe.com FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

Turner Laboratories
2445 N. Coyote Drive, Ste. 104
Tucson, AZ 85745

Sampling Date: April 23, 2018
Sample Received: May 01, 2018
Analysis Completed: May 22, 2018

Sample ID	Gross Alpha Activity Method 600/00-02 (pCi/L)	Uranium Activity Method ASTM D6239 (pCi/L)	Adjusted Gross Alpha (pCi/L)	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
18D0619-01	17.7 ± 0.9	12.9 ± 1.2	4.8 ± 1.5	3.1 ± 0.3	3.1 ± 0.4	6.2 ± 0.5
Date of Analysis	5/2/2018	5/21/2018	5/21/2018	5/4/2018	5/4/2018	5/4/2018

Robert L. Metzger, Ph.D., C.H.P. 5/22/2018
Laboratory License Number AZ0462 Date

Radiation Safety Engineering, Inc.
3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121 (480) 897-9459
Website: www.radsafe.com FAX (480) 892-5446

Isotopic Uranium Analysis

Turner Laboratories
2445 N. Coyote Drive, Ste. 104
Tucson, AZ 85745

Sampling Date: April 23, 2018
Sample Received: May 01, 2018
Uranium Analysis Date: May 21, 2018

Sample No.	^{238}U	^{235}U	^{234}U	Total	
18D0619-01	6.0 ± 0.6	0.280 ± 0.004	6.6 ± 0.6	12.9 ± 1.2	Activity (pCi/L)
	17.9 ± 1.7	0.131 ± 0.002	0.00106 ± 0.00010	18.0 ± 1.7	Content (µg/L)
	Comments:				

Robert L. Metzger, Ph.D., C.H.P. 5/22/2018
Date

Laboratory License Number AZ0462

Arizona Department of Environmental Quality

Drinking Water Radionuclides-Adjusted Gross Alpha, Radium 226 & 228, Uranium Analysis Report

Samples To Be Taken At Entry Point Into Distribution System (EPDS) Only

PWS ID#: AZ04 _____ PWS Name: _____

April 23, 2018 (Sample Date) 15:55 (Sample Time) (24 hour clock) _____ (Owner/Contact Person)

_____ (Owner/Contact Fax Number) _____ (Owner/Contact Phone Number)

Sample Collection Point

☐ EPDS # _____

Compliance Sample Type:

☐ Reduced Monitoring — Date Q1 collected: _____

☐ Quarterly — Date Q2 collected: _____

☐ Composite of four quarterly samples — Date Q3 collected: _____

Date Q4 collected: _____

*****RADIOCHEMICAL ANALYSIS*****

>>>To be filled out by laboratory personnel<<<

*****Combined Uranium must be reported in micrograms per liter*****

Analysis Method	MCL	Reporting Limit	Contaminant Name	Cont. Code	Analyses Run Date	Result		Exceed MCL
	15 pCi/L		Adjusted Gross Alpha	4000	5/21/2018	4.8 ± 1.5		
600/00-02		3 pCi/L	Gross Alpha	4002	5/2/2018	17.7 ± 0.9		
7500 - Rn			Radon	4004				
ASTM D6239	30 µg/L	1 µg/L	Combined Uranium	4006	5/21/2018	18.0 ± 1.7	µg/L	
			Uranium 234	4007	5/21/2018	0.00106 ± 0.00010		
			Uranium 235	4008	5/21/2018	0.131 ± 0.002		
			Uranium 238	4009	5/21/2018	17.9 ± 1.7		
	5 pCi/L	1 pCi/L	Combined Radium (226,228)	4010	5/4/2018	6.2 ± 0.5		X
GammaRay HPGE		1 pCi/L	Radium 226	4020	5/4/2018	3.1 ± 0.3		
GammaRay HPGE		1 pCi/L	Radium 228	4030	5/4/2018	3.1 ± 0.4		

*****LABORATORY INFORMATION*****

>>>To be filled out by laboratory personnel<<<

Specimen Number: RSE60312

Lab ID Number: AZ0462

Lab Name: Radiation Safety Engineering, Inc.

Printed Name and Phone Number of Laboratory Contact: Robert L. Metzger, Ph.D., C.H.P. (480) 897-9459

Comments: 18D0619-01

Authorized Signature: Robt L. Metzger

Date Public Water System Notified: _____

DWAR 6: 11/2007

SUBCONTRACT ORDER

Turner Laboratories, Inc.

18D0619

SENDING LABORATORY:

Turner Laboratories, Inc.
2445 N. Coyote Drive, Ste #104
Tucson, AZ 85745
Phone: 520.882.5880
Fax: 520.882.9788
Project Manager: Kevin Brim

RECEIVING LABORATORY:

Radiation Safety Engineering, Inc.
3245 N. Washington St.
Chandler, AZ 85225-1121
Phone :(480) 897-9459
Fax: (480) 892-5446
Please CC Kevin Brim Kbrim@turnerlabs.com

Analysis	Expires	Laboratory ID	Comments
Sample ID: 18D0619-01 Drinking Water Sampled:04/23/2018 15:55			
Radiochemistry, Gross Alpha	10/20/2018 15:55		Analyze Uranium and Adjusted Alpha if G. Alpha is > 12
Radiochemistry, Radium 226/228	05/23/2018 15:55		
Containers Supplied:			

H 60312

Released By	Date	Received By	Date
[signature]	4/30/18 16:00	UPS	4/30/18 16:00
Released By	Date	Received By	Date

APPENDIX D

Well Completion Documentation

PIPE TALLY

Project Name.:	FCI	Project No.:	129687
Well No.:	K-03	Date:	11-11-17
Location:		Pipe Talley for:	TREMMIE FOR GROUT OVERBURDEN
Total Depth:	501.14	Geologist:	C. GIUSTI

Type of Connections: ☐ Welded ☐ T+C ☑ Flush Thread ☐ Other

Pipe	✓	Length (ft)	Length Σ (ft)	Pipe Type	Dist. from sensor bottom to bottom of pipe (feet)	Sensor Type (ACD, CS, ERT)	Sensor ID	Wire Lead ID	Depth of Sensor (feet bgs)
1	✓	2.80	2.80	CONNECTING	TOC FOR	CEMENT	SHOE		
2	✓	30.90	33.70	2.875" STEEL					
3	✓	30.60	64.30						
4	✓	29.78	94.0						
5	✓	31.44	125.44						
6	✓	31.00	156.44						
7	✓	31.14	187.58						
8	✓	30.54	218.12						
9	✓	30.55	248.67						
10	✓	31.54	280.21						
11	✓	31.43	311.64						
12	✓	30.56	342.2						
13	✓	30.56	372.76						
14	✓	31.17	403.93						
15	✓	31.22	435.15						
16	✓	28.17	463.32						
17	✓	30.64	493.96						
18	✓	9.81	503.77						
19	✓	3.84	507.61						
20	✓	3.75	511.36	↓					

Notes:

TOTAL TREMMIE IN BGS = 501.96

501.14 TO CEMENT SHOE

2.875" STEEL FLUSH THREAD

SUMMARY OF TALLY

Total Length tallied:	511.36
Casing Stick-Up:	9.40 AGS
Length of Casing Cut-Off:	—
Bottom of Well:	501.14
Screened Interval:	—
Total Screen in Hole:	—

Sensor Types: Annular Conductivity Device (ACD), installed as pairs with 3 ft spacing
Conductivity Sensor (CS) 4 sensors with sing lead 20 ft spacing
Electrical Resistivity Tomography (ERT)

HALEY ALDRICH

HALEY ALDRICH

PIPE TALLY

Project Name.: FCI PTS	Project No.: 128682-007
Well No.: R-03	Date: 11/10/17
Location: Florence	Pipe Talley for: Intermediate casing
Total Depth: 505'	Geologist: S Hensel

Type of Connections: ☒ Welded ☐ T+C ☐ Flush Thread ☐ Other

Pipe	✓	Length (ft)	Length Σ (ft)	Pipe Type	Dist. from sensor bottom to bottom of pipe (feet)	Sensor Type (ACD, CS, ERT)	Sensor ID	Wire Lead ID	Depth of Sensor (feet bgs)
–	✓	2.15	2.15	Grout shoe					
1	✓	40.28	42.43	14' casing	Polyethylene bonded LCS				
2	✓	40.26	82.69	↓	↓				
3	✓	40.27	122.96						
4	✓	40.31	163.27						
5	✓	40.34	203.61						
6	✓	40.36	243.97						
7	✓	40.33	284.30						
8	✓	40.32	324.62						
9	✓	40.34	364.96						
10	✓	40.32	405.28						
11	✓	40.34	445.62						
12	✓	40.34	485.96						
13	✓	40.33	526.29						

Notes:
Centralizers every rod (40')
LCS - low carbon steel
14" OD 0.312" wall thickness
~~Casing at 491.89~~ CG

\+ casing left above ground surface

SUMMARY OF TALLY

Total Length tallied: CASING	524.14
Casing Stick-Up:	23' AGS
Length of Casing Cut-Off:	
Bottom of Well:	501.14
Screened Interval:	—
Total Screen in Hole:	—

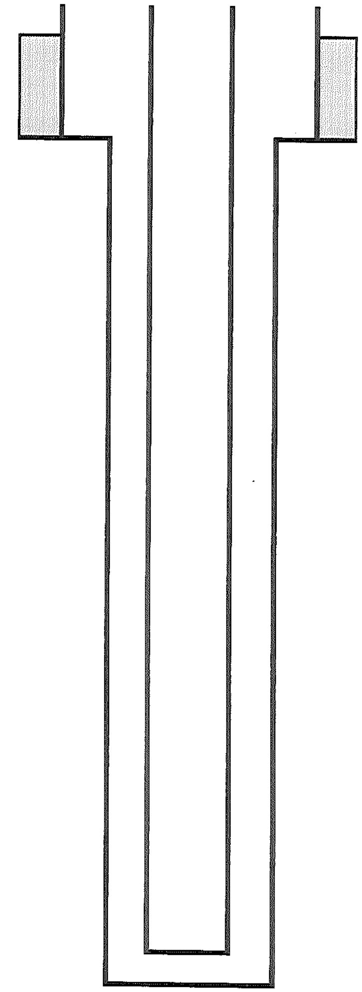
Sensor Types: Annular Conductivity Device (ACD), installed as pairs with 3 ft spacing
Conductivity Sensor (CS) 4 sensors with sing lead 20 ft spacing
Electrical Resistivity Tomography (ERT)

HALEY ALDRICH

TOTAL TALLY WITHOUT GROUT SHOE = 524.14
TOTAL CASING STICK UP ABOVE GROUND SURFACE AT LANDING = 23.0 FT
CASING LANDED AT 501.14 FT CG

ESTIMATED ANNULAR MATERIAL RECORD

Project Name: FCI **Project #.:** 129687-007 **Date:** 11-11-17
Well No.: R-03 **Geologist:** C. Giusti



ANNULAR VOLUME CALCULATIONS

Total Depth of Borehole [T]: 505 feet
Borehole Diameter [D]: 20 inches
Screen Length [L_s]: — feet
Screen Diameter [d_s]: — inches
Casing Length [L_c]: 501 feet
Casing Diameter [d_c]: 14 inches

Total Cased Depth: 501 feet
Rat Hole Volume [$R=(D^2)\ 0.005454*L_r$]: 2.18 Ft^3
Rat Hole Length [L_r]: 4 feet
Camera Tube Length [L_{ct}]: — feet
Camera Tube Diameter [d_{ct}]: — inches

Screen Annular Volume (A_s): $(D^2-d_s^2)\ 0.005454$ = — Ft^3/Lin. Ft
Casing Annular Volume (A_c): $(D^2-d_c^2)\ 0.005454$ = 1.11 Ft^3/Lin. Ft
Casing/Cam.Tube Annular Volume (A_{c+ct}): $(D^2-d_c^2-d_{ct}^2)\ 0.005454$ = — Ft^3/Lin. Ft

EQUATIONS

2,700 lbs. Silica Sand = 1 cubic yard = 27 cubic feet
[1] Volume of bag (Ft^3) = bag weight/100
[2] Calculated depth = Previous Calculated depth - (v/A)

Bentonite Sack = 0.69 ft^3
Silica Sand Super Sack = 3000 lbs.

TYPE V. CEMENT

No.	✓	Weight of Bag (lbs.)	Volume of Bag[1] (v) (ft^3)	Total Vol. of Bags (ft^3)	Calculated Depth[2] (ft bls)	Tagged Depth (ft bls)	Comments
1		63826	937	937		SURFACE	679 94 lbs SACKS
							AV WEIGHT = 14.3 lbs/gal

0-40' : 2.07 ft³/lnft × 40' = 82.9 ft³
40-501' = 1.11 ft³/lnft × 461' = 511.71 ft³
501-505' = 2.18 ft³/lnft × 4' = 8.72 ft
Σ = 603.3 ft³ = 22.3 yd³ = 107.5 barrels
+20%. ≈ 129 barrels

167 BARRELS OF SLURRY IN
→ CEMENT @ SURFACE WEIGHT 13.4 lbs/gal
≈ 937 ft³

~~+155%~~ CAL. CALCULATED VOLUME +55%.

PIPE TALLY

Project Name.:	FCI	Project No.:	179687
Well No.:	R-03	Date:	1-7-18, - 1-8-18
Location:	FLORENCE AZ	Pipe Talley for:	WELL INSTALL
Total Depth:	1225	Geologist:	CG, GF

Type of Connections: ☐ Welded ☐ T+C ☒ Flush Thread ☐ Other

	Pipe	✓	Length (ft)	Length Σ (ft)	Pipe Type	Dist. from sensor bottom to bottom of pipe (feet)	Sensor Type (ACD, CS, ERT)	Sensor ID	Wire Lead ID	Depth of Sensor (feet bgs)
	1	✓	0.36	0.36	SS END CAP					
	2	✓	20.04	20.4	SCH 80 PVC SCREEN					
	3	✓	20.02	40.42		11.03	ERT	12		
	4	✓	20.04	60.46						
*	5	✓	20.02	80.48						
	6	✓	20.05	100.53						
*	7	✓	20.03	120.56		10.33	ERT	11		
	8	✓	20.04	140.60						
*	9	✓	20.02	160.62						
	10	✓	20.04	180.66		10.14	ERT	10		
*	11	✓	20.04	200.70						
	12	✓	20.04	220.74		10.16	ERT	9		
*	13	✓	20.05	240.79						
	14	✓	20.04	260.83						
*	15	✓	20.03	280.86		10.13	ERT	8		
	16	✓	20.04	300.90	↓					
*	17	✓	20.00	320.90	BLANK PVC					
	18	✓	20.03	340.93	SCH 80 PVC SCREEN	10.13	ERT	7		
*	19	✓	20.04	360.97						
	20	✓	20.02	380.99						
*	21	✓	20.04	401.03		10.00	ERT	6		
	22	✓	20.04	421.07						
*	23	✓	20.04	441.11						
	24	✓	20.03	461.14		10.09	ERT	5		
*	25	✓	20.03	481.17						
	26	✓	20.04	501.21						
*	27	✓	20.03	521.24		10.09	ERT	4		
	28	✓	20.03	541.27	↓					
*	29	✓	20.00	561.27	BLANK PVC					
	30	✓	20.03	581.30	SCH 80 PVC SCREEN	4.85	TRANSDUCER			
						10.12	ERT	3		

Notes:
1-316 SS END CAP

SUMMARY OF TALLY

Total Length tallied:	1205.14
Casing Stick-Up:	1.98 (w/ coupler)
Length of Casing Cut-Off:	-
Bottom of Well:	1203.16
Screened Interval:	
Total Screen in Hole:	

Sensor Types: Annular Conductivity Device (ACD), installed as pairs with 3 ft spacing
Conductivity Sensor (CS) 4 sensors with sing lead 20 ft spacing
Electrical Resistivity Tomography (ERT)

* TRANSDUCER GEOKON SN: 174007G, MODEL: 3400HD-3-2.5MPa
* = CENTRALIZER

HALEY ALDRICH

HALEY ALDRICH

PIPE TALLY

Project Name.:	FCT	Project No.:	129687
Well No.:	R-03	Date:	1/3/18
Location:	FLORENCE, AZ	Pipe Talley for:	
Total Depth:	122 ft	Geologist:	K FORD, G BUSHEE

Type of Connections: ☐ Welded ☑ T+C ☑ Flush Thread ☐ Other

Pipe	✓	Length (ft)	Length Σ (ft)	Pipe Type	Dist. from sensor bottom to bottom of pipe (feet)	Sensor Type (ACD, CS, ERT)	Sensor ID	Wire Lead ID	Depth of Sensor (feet bgs)
31	✓	20.04	601.34	SCH80 PVC SCREEN					
32	✓	20.03	621.37	↓					
33	✓	20.03	641.46	↓	10.03	ERT	2		
34	✓	20.04	661.44	↓					
35	✓	20.04	681.48	↓					
36	✓	0.50	681.98	SS XOVER					
37	✓	29.06	711.04	FRP 5"	9.39	ERT	1		
38	✓	29.06	740.1	↓					
39	✓	29.12	769.22	↓					
40	✓	28.95	798.17	↓					
41	✓	28.98	827.15	↓					
42	✓	29.05	856.20	↓					
43	✓	29.80	886.00	↓					
44	✓	29.05	914.05	↓					
45	✓	29.98	944.03	↓					
46	✓	29.09	973.12	↓					
47	✓	28.80	1001.92	↓					
48	✓	29.85	1030.77	↓					
49	✓	28.95	1059.72	↓					
50	✓	29.00	1088.72	↓					
51	✓	29.12	1117.84	↓					
52	✓	29.10	1146.94	↓					
53	✓	29.10	1176.04	↓					
54	✓	29.10	1205.14	↓					

Notes:

SUMMARY OF TALLY

Total Length Tallied:	1205.14
Casing Stick-Up:	1.98 (w/ coupler)
Length of Casing Cut-Off:	-
Bottom of Well:	1203.16
Screened Interval:	1202.8 – 902.26, 882.26 – 661.89, 641.89 – 521.68
Total Screen in Hole:	641.17

Sensor Types: Annular Conductivity Device (ACD), installed as pairs with 3 ft spacing
Conductivity Sensor (CS) 4 sensors with sing lead 20 ft spacing
Electrical Resistivity Tomography (ERT)

HALEY ALDRICH

HALEY ALDRICH

Casing Layout

Project Name.:	Florence Copper INC	**Project No.:**	129687-007
Well No.:	R-03	**Date:**	1.7.17 - 1.8.17
Location:	Florence AZ	**Layout for:**	Well Casing Install
Total Depth:	1203.07	**Geologist:**	C. Giusti / G. Foushee

Pipe Length		Depth BGS
		761.96
20.04	23	782.00
20.04	22	802.04
20.04	21	822.08
20.02	20	842.10
20.04	19	862.14
20.03	18	882.17
20.00	17	902.17
20.04	16	922.21
20.03	15	942.24
20.04	14	962.28
20.05	13	982.33
20.04	12	1002.37
20.04	11	1022.41
20.04	10	1042.45
20.02	9	1062.47
20.04	8	1082.51
20.03	7	1102.54
20.05	6	1122.59
20.02	5	1142.61
20.04	4	1162.65
20.02	3	1182.67
20.04	2	1202.71
0.36	1	1203.07

Pipe Length		Depth BGS
		230.04
29.00	46	259.04
29.98	45	289.02
29.05	44	318.07
28.80	43	346.87
29.05	42	375.92
28.98	41	404.90
28.95	40	433.85
29.12	39	462.97
29.06	38	492.03
29.06	37	521.09
0.50	36	521.59
20.04	35	541.63
20.04	34	561.67
20.03	33	581.70
20.03	32	601.73
20.04	31	621.77
20.03	30	641.80
20.00	29	661.80
20.03	28	681.83
20.03	27	701.86
20.04	26	721.90
20.03	25	741.93
20.03	24	761.96

Pipe Length		Depth BGS
	69	
	68	
	67	
	66	
	65	
	64	
	63	
	62	
	61	
	60	
	59	
	58	
	57	
	56	
	55	-1.98
29.10	54	27.12
29.10	53	56.22
29.10	52	85.32
29.12	51	114.44
29.00	50	143.44
28.95	49	172.39
28.85	48	201.24
28.80	47	230.04

SENSOR DETAILS

Sensor Type	Sensor ID	Pipe #	Distance from Bottom of Sensor to Bottom of Pipe	Depth of Sensor (BGS)
ERT	12	3	11.03	1171.64
ERT	11	7	10.33	1092.21
ERT	10	10	10.14	1032.31
ERT	9	12	10.16	992.21
ERT	8	15	10.13	932.11
ERT	7	18	10.13	872.04
ERT	6	21	10.00	812.08
ERT	5	24	10.09	751.87
ERT	4	27	10.09	691.77
ERT	3	30	10.12	631.68
ERT	2	33	10.03	571.67
ERT	1	37	9.39	511.70
Trans		30	4.85	636.95
				#REF!
				#REF!
				#REF!

Pipe Number	Type
1	SS End Cap
2 -16	PVC SCH 80 Screen 0.020
17	PVC SCH 80 Blank
18-28	PVC SCH 80 Screen 0.020
29	PVC SCH 80 Blank
30-35	PVC SCH 80 Screen 0.020
36	PVC/FRP Adaptor
36-54	FRP

Notes:

HALEY ALDRICH

ESTIMATED ANNULAR MATERIAL RECORD

Project Name: FCI **Project #.:** 129687 **Date:** 1-9-17
Well No.: R-03 **Geologist:** KFORD

ANNULAR VOLUME CALCULATIONS

Total Depth of Borehole [T]:	1225 feet	Total Cased Depth:	1203 feet
Borehole Diameter [D]:	12.25 inches	Rat Hole Volume [$R=(D^2)\ 0.005454*L_r$]:	Ft³
Screen Length [L_s]:	feet	Rat Hole Length [L_r]	feet
Screen Diameter [d_s]:	inches	Camera Tube Length [L_{ct}]	feet
Casing Length [L_c]	feet	Camera Tube Diameter [d_{ct}]	inches
Casing Diameter [d_c]	5.56 inches		

Screen Annular Volume (A_s): $(D^2-d_s^2)\ 0.005454 =$ ✱ 0.65 THEOR Ft³/Lin. Ft

Casing Annular Volume (A_c): $(D^2-d_c^2)\ 0.005454 =$ ✱ 0.66 Ft³/Lin. Ft

Casing/Cam.Tube Annular Volume (A_{c+ct}): $(D^2-d_c^2-d_{ct}^2)\ 0.005454 =$ ______ Ft³/Lin. Ft

CEMENT IN 14" CSG: 0.90 ft³/ft X 494 = 420 ft³ = 16 YARDS

EQUATIONS

2,700 lbs. Silica Sand = 1 cubic yard = 27 cubic feet

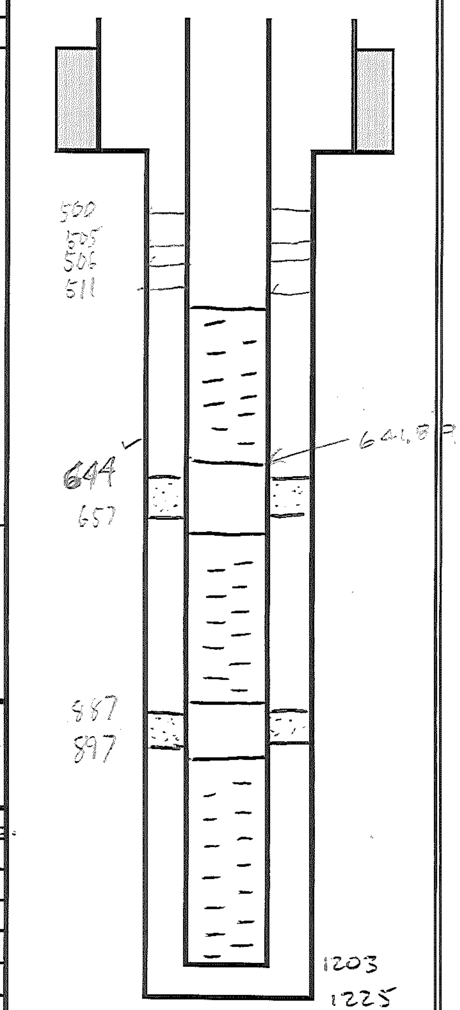
[1] Volume of bag (Ft³) = bag weight/100

[2] Calculated depth = Previous Calculated depth - (v/A)

Bentonite Sack = 0.69 ft³

Silica Sand Super Sack = 3000 lbs.

No.	✓	Weight of Bag (lbs.)	Volume of Bag[1] (v) (ft³)	Total Vol. of Bags (ft³)	Calculated Depth[2] (ft bls)	Tagged Depth (ft bls)	Comments
1	✓	~2000	~20	~20	1202	(~1195)	3/4+ SK. Tremie backedup.
2	✓	2700	27	~47		–	
3	✓	~700	~7	54	~~1178~~ 1162	1160	Remaining 1/4 SK from #1.
4	✓	3000	30	84	1120	1105	
5	✓	3000	30	114	1090	~~1069~~	
6	✓	3000	30	144	1075	1069	
7	✓	3000	30	174	1060		



✱ Hole is severely washed due to drilling out PVC + multiple cleanouts → refer to Volume log ✓

HALEY ALDRICH

ESTIMATED ANNULAR MATERIAL RECORD (Continued)

Project Name: FCI Project No.: 129687 Geologist: A. FOUSHEE, K. FORD, Z. SMITH, S HERGET

Well No.: K-03 Date:

No.	✓	Weight of Bag (lbs.)	Volume of Bag[1] (v) (ft^3)	Total Vol. of Bags (ft^3)	Calculated Depth[2] (ft bls)	Tagged Depth (ft bls)	Comments
8	✓	3000	30	204	1050	1025	TREMIE IS @ 1010'
9	✓	3000	30	234	1000	~~974~~	NOT TAGGED - BOTTOM OF TREMIE
10	✓	3000	30	264	950	977'	PULL TREMIE → 942'
11	✓	3000	30	294	950		
12	✓	3000	30	324	925	947'	#6 SAND 3000 lb. SUPER SACK
13	✓	3000	30	354	935	957	PULL TREMIE → 913.39'
14	✓	3000	30	384	915	915	#6 SAND 3000 lb SUPER SACK
15	✓	1560	15	399	908	919	#6 SAND 1/2 SUPER SACK. PULL TREMIE → 882.27
16	✓	1560	15	414	908	903	" " " " "
17	✓	66.6	0.66	422	897	963	#6 SAND 5 gallon buckets (x12)
18	✓	66.6	0.66	436	897	894	#6 SAND " " " " (x12)
19	✓	66.6	0.66	434	897	895	" " " " " (x6)
—	—	—	—	—	—	899	SAND 1100 - 1200 ft BLS (15 min. intervals)
20	✓	66.6	0.66	436	897	897	#6 SAND 5 gallon buckets (x12)
—	—	—	—	—	—	898	SAND 1100 - 1200 ft BLS (10 min. intervals)
—	—	—	—	—	—	895	" " " " " "
—	—	—	—	—	—	900.5	SAND 1000 - 1100 ft BLS (15 mins)
—	—	—	—	—	—	900.0	#6 SAND 5 gallon buckets (x9)
21	✓	66.6	0.66	440.6	897	896	#6 SAND 5 gallon buckets (x9)
22	✓	66.6	0.66	443.3	897	898	SAND 1100 - 1000 (10 mins)
—	—	—	—	—	—	899	SAND 900 - 1000 (15 mins)
—	—	—	—	—	—	899	#6 SAND 5 gal bucket (x2)
23	✓	66.6	0.66	444.62	897		

Notes:

B 3,

ESTIMATED ANNULAR MATERIAL RECORD (Continued)

Project Name: FCI **Project No.:** 129687-007 **Geologist:** S Hensel; Z. Smith

Well No.: R-03 **Date:** 1/10/18

No.	✓	Weight of Bag (lbs.)	Volume of Bag[1] (v) (ft^3)	Total Vol. of Bags (ft^3)	Calculated Depth[2] (ft bls)	Tagged Depth (ft bls)	Comments
24	✓	66.6	0.66	445.94	897	897	#6 sand 5 gal bucket (x2)
—	—	—	—	—	—	897	Swab 900-1000 (10 min)
25	✓	50	0.5	450.44	889	895	#60 sand 50 lbs bag (x10)
26	✓	50	0.5	458.44	857	886	#60 sand 50 lbs bag (x15)
27	✓	2000	20	478.44	872	—	#6 sand remaining S.S. (2/3)
28	✓	3000	30	508.44	859	861	#6 sand full S.S.
29	✓	3000	30	538.44	851	—	#6 sand full S.S.
30	✓	3000	30	568.44	840	834	#6 sand full S.S.
31	✓	3000	30	598.44	825	—	#6 sand; full S.S.
32	✓	3000	30	628.44	815	804	#6 sand, full S.S.
33	✓	3000	30	668.44	792	—	#6 sand full S.S., tremie up to 760.12
34	✓	3000	30	688.44	775	769	#6 sand full S.S.
35	✓	3000	30	728.44	748	—	Pull tremie to 729.12; #6 sand full S.S.
36	✓	3000	30	758.44	727	728	#6 sand full S.S; Pull tremie to 697.96
37	✓	3000	30	788.44	707	—	#6 sand full S.S
38	✓	3000	30	818.44	686	688	Pulled tremie to 667.97; #6 sand full S.S
39	✓	3000	30	848.44	667	667	#6 sand full S.S.
40	✓	~1000	~10	858.44	660	663	#6 sand 1/3 S.S
41	✓	866.6	8.66	568.18	657	658	#6 sand 5 gallon bucket (x 14)
—	—	—	—	—	—	660	Swab 885-775 (15 mins)
42	✓	66.6	0.66	572.18	557	658	#6 sand 5 gallon buckets (x 6)
—	—	—	—	—	—	657	Swab 885-775 (10 mins)

Notes: [illegible] sand interval starts at 657

Estimated ft^3/ft from 540-740 = 1.43 ft^3/ft

S.S = Super Sack

x Tagged depth check 3 times

K:\Templates\Field Forms\Well Inst & Testing Forms.xls

HALEY ALDRICH

ESTIMATED ANNULAR MATERIAL RECORD (Continued)

Project Name: FCI 2 PTI⁵ **Project No.:** 129687-007 **Geologist:** [illegible]

Well No.: R-03 **Date:** [illegible]

	No.	✓	Weight of Bag (lbs.)	Volume of Bag[1] (v) (ft^3)	Total Vol. of Bags (ft^3)	Calculated Depth[2] (ft bls)	Tagged Depth (ft bls)	Comments
	—	—	—	—	—	—	659	Swab 660-775 ft BLS (15 mins)
	—	—	—	—	—	—	659	Swab 660-775 ft BLS (10 mins)
	43	✓	66.6	0.66	574.82	657	658	#6 Sand 4x 5 gallon buckets
	44	✓	66.6	0.66	576.8	657	657	#6 Sand 3x 5 gallon bucket
	45	✓	50	0.5	584.3	652	~~654~~ 654	#60 Sand 50 lb sacks (x15)
	46	✓	50	0.5	591.8	643	652	#60 SAND, 50lb SX x 15
SS	47	✓	50	0.5	599.3	641	644	#60 SAND, 50lb SX x 15
30 *	48	✓	~3000	~10	~609	629		
31	~~49~~	✓	3000	30	639	603		
32	50	✓	3000	30	669	577	590	—Bottom TREMIE 602' BLS
33	51	✓	3000	30	699	551		—Bottom TREMIE 570' BLS
34	52	✓	3000	30	729	525	549	Bottom TREMIE 537'
35	53	✓	3000	30	759	523	537	Bottom TREMIE @ 506'
36	54	✓	3000	30	789	511	532	
↓	55	✓	~~3000~~ ~1500	~~30~~ 15	804		525	
	56	✓	~150	7.5	811.5		522	
37	57	✓	~150	7.5	819		520	
	58	✓	~150	7.5	826.5		511	→BEGIN TO SWAB 520-640, TAG @ END = 514
	59	✓	67	0.67	829		514	#6 SAND 5 GAL Bucket x 2
	60	✓	67	0.67	831	512	515	#6 Sand 5 gal Bucket (x3)
	61	✓	67	0.67	832.7	511	513	#6 Sand 5 gallon Bucket (x4)
	62	✓	67	0.67	834.7	511	517	#6 Sand 5 gallon Bucket (x3)

Notes: * ENTRY #48 CORRESPONDS TO FINISHING THE REMAINDER OF SS BAG #30

HALEY ALDRICH

ESTIMATED ANNULAR MATERIAL RECORD (Continued)

Project Name: FCC - PTF **Project No.:** 129687-007 **Geologist:** E. Smith
Well No.: R-03 **Date:** 1/12/18

No.	✓	Weight of Bag (lbs.)	Volume of Bag[1](v) (ft^3)	Total Vol. of Bags (ft^3)	Calculated Depth[2] (ft bls)	Tagged Depth (ft bls)	Comments
–	–	–	–	–	–	511	Sand 640-520 ft BLS (10 mins)
63	✓	50	0.5	838.2	507	510	50 lb bags of #60 Sand (x7)
64	✓	50	0.5	843.2	506	506	50 lb bags of #60 Sand (x10)
65	✓	67	0.67	843.9	505	505	1.5 gallon buckets of bentonite; Pull tremie to 970
66		50	0.5	848.9	500	497	50 lb bags of #60 Sand (x10) ✓
67	✓		464 cement slurry			494'	Expect ≈ 20 yds from caliper log vs 16 from calc.
			= 17.2 yards, 108% of expected.				

Notes:

HALEY ALDRICH

CEMEX

58776423

IR-03

Plant:	Begin Loading:	To Job:	Arrive Job:	Start Unload:	Finish Unload:	Leave Job:	Return Plant:
	746						

Customer Code: Customer Name: Customer Job Number: Order Code / Date:

Project Code: Project Name: Project P.O. Number: Order P.O. Number:

Ticket Date: Delivery Address: Map Page: Map/Row/Column:

Delivery Instructions: Dispatcher:

Ticket Number:

Due On Job:	Slump:	Truck Number:	Driver Number:	Driver Name:	End Use:

LOAD QUANTITY	CUMULATIVE QUANTITY	ORDERED QUANTITY	MATERIAL CODE	PRODUCTION DESCRIPTION	UOM	UNIT PRICE	AMOUNT

☐ Cash ☐ Check ☐ Charge	Check # / Auth Code:	Signature of Driver Receiving Cash:	Cash Received:	Total COD Order Amount to Collect Without Standby Charges:

Comments:

WATER ADDED: _____ GAL YARDS IN DRUM: _____ WHEN ADDED.

_____ SIGNATURE

CURB LINE CROSSED AT OWNER'S/AGENT'S REQUEST:

_____ SIGNATURE

❑ LOAD WAS TESTED BY: _____

Notice: Our drivers will make every effort to place materials where the customer designates, but the Company assumes no responsibility for damages inside curb or property line. Customer agrees to the terms of sale and delivery and accepts concrete as is. Due to important factors which are out of our control after delivery, this Company will not accept any responsibility for the finished results. No credit for returned concrete. Buyers exceptions and claims shall be deemed waived unless made to us in writing within one business day after the receipt of materials.

SPECIAL TERMS: Any water added is at customers own risk. If water is added on job, concrete strength is no longer guaranteed. **WARNING**: Product may cause skin and/or eye irritation. **CAUTION**: Material may be hazardous to your safety and health. Please refer to the backside of this ticket for important safety handling information, and to the material safety data sheets for additional information.

AUTHORIZED SIGNATURE:

Ⓧ

68UNIVERSAL

INVOICE

42568302 41069165

BASIC ENERGY SERVICES

3451 LeTourneau
Gillette, WY 82718
307-682-5258

Cementing Ticket No. 1719 21328A

Date	Customer Order No.	Sect.	Twp.	Range	Truck Called Out	On Location	Job Began	Job Completed
11/11/17						1:30p	3:00p	4:00p

Owner: Florence Copper Mine
Contractor:
Charge To: Hydro Resources West
Mailing Address:
City:
State:

Well No. & Form: RDH 3
Place: Florence Copper Mine
County: Pinal
State: Ariz

Depth of Well:
Depth of Job: 500
Casing (New / Used) Size: 14 3/4
Weight:
Size of Hole: 20
Amt. and Kind of Cement: 600
Cement Left in casing by:
Request Necessity: feet

Kind of Job: Surface
Drillpipe:
Tubing: 2 7/8
(Rotary / Cable)
Truck No.: 28983

Price Reference No.:
Price of Job: 2541.00
Second Stage:
Pump Truck Mileage: 3825.00
P.U. Mileage: 765.00
Other Charges:
Total Charges: 7,131.00

Remarks: **Safety meeting water ahead 10bbls. mix 687sks cemt. class 25. disp. 22bbls. shutdown.**

Cementer: Jim — Lead Yield: 1.38 — Lead Wt.: 14.5 — Lead Water: 6.8 — SV: 167
Helper: Bryan — Tail Yield: — Tail Wt.: — Lead Water: — SV:
District: Gillette — State: Wyo.

The above job was done under supervision of the owner, operator, or his agent whose signature appears below.

Agent of contractor or operator

Sales Ticket for Materials Only

QUANTITY SACKS	BRAND AND TYPE	PRICE	TOTAL
16	crew subsistance	500.0	8,000.00
8	tranfer cemt.	150.00	1,200.00
			0.00
			0.00
			0.00
			0.00
			0.00
			0.00
			0.00
			0.00
			0.00
			0.00
			0.00
			0.00
			0.00
Plugs			0.00
	687 Handling & Dumping	2.44	1,676.28
	Mileage		0.00
	Sub Total		18,007.28
	Discount		
	Sales Tax		
	Total		

Equipment#	HRS
28983	1
84127/8544	

Signature of operator

926135 48 41681477

BASIC ENERGY SERVICES

3451 LeTourneau
Gillette, WY 82718
307-682-5258

Cementing Ticket No. 1719 21367

Date	Customer Order No.		Sect.	Twp.	Range	Truck Called Out	On Location	Job Began	Job Completed
01-12-18						8:00	8:30	22:30	00:00

Owner: Florance Copper Mine
Contractor: Hydro Resources
Charge To: Hydro West
Mailing Address:
City:
State: 1011561

Well No. & Form: R 03
Place: copper mine
County: Pinal
State: AZ

Depth of Well: 1225
Depth of Job: 494
Casing (New / Used) Size: 5.5
Weight:
Size of Hole: 16 inch
Amt. and Kind of Cement:
(Cement Left / In casing by) Request Necessity: 0 feet

Kind of Job: production string
Drillpipe:
Tubing: 2 7/8
(Rotary / Cable)
Truck No.: 28983

Price Reference No.:
Price of Job: 1210
Second Stage:
Pump Truck Mileage: 3825
P.U. Mileage: 765
Other Charges:
Total Charges: 5,800.00

Remarks:
safety meeting held
rig up to tubing with hose and valve
pump 5 bbls to clear tubing
pump and mix 340 sks type 2/5 cement
displace .5 bbl thru mixer
rig down from tubing
wash up in cellar
good cement to surface
THANK YOU

Cementer: Bryan Hammond — Lead Yield: 1.38 — Lead Wt.: 14.6 — Lead Water: 6.8 — SV: 83
Helper: John Crahan — Tail Yield: — Tail Wt.: — Lead Water: — SV:
District: Gillette — State: Wy

The above job was done under supervision of the owner, operator, or his agent whose signature appears below.

Agent of contractor or operator

Sales Ticket for Materials Only

QUANTITY SACKS	BRAND AND TYPE	PRICE	TOTAL
16	Crew subsistance	500	8,000.00
8	Transportaton of cement	150	1,200.00
			0.00
			0.00
			0.00
	P.O # 152614		0.00
			0.00
			0.00
			0.00
			0.00
			0.00
			0.00
			0.00
Plugs			0.00

Equipment #	HRS				
28983	1.5	340	Handling & Dumping	2.44	829.60
84127	1		Mileage		0.00
			Sub Total		15,829.60
			Discount		
			Sales Tax		
			Total		

Signature of operator

APPENDIX E

Geophysical Logs

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY FLORENCE COPPER
WELL ID R-03
FIELD FLORENCE COPPER
COUNTY PINAL STATE ARIZONA

TYPE OF LOGS: E-LOG
MORE: NAT. GAMMA
LOCATION

SEC TWP RGE

OTHER SERVICES
3-ARM CALIPER
TEMPERATURE
FLUID RESISTIVITY
SONIC
DEVIATION

PERMANENT DATUM ELEVATION K.B.
LOG MEAS. FROM GROUND LEVEL ABOVE PERM. DATUM D.F.
DRILLING MEAS. FROM GROUND LEVEL G.L.

DATE	11-10-17 / 12-8-17	TYPE FLUID IN HOLE	MUD
RUN No	1 & 2	MUD WEIGHT	N/A
TYPE LOG	E-LOG - NAT. GAMMA	VISCOSITY	N/A
DEPTH-DRILLER	1220 FT.	LEVEL	FULL
DEPTH-LOGGER	1220 FT.	MAX. REC. TEMP.	26.02 DEG. C
BTM LOGGED INTERVAL	1220 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	A. OLSON / M. QUINONES	TOOL STRING/SN	MSI E-LOG 40GRP SN 5019
WITNESSED BY	SCOTT - H&A	LOG TIME:ON SITE/OFF SITE	7:00 P.M.

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN.	SURFACE	40 FT.	24 IN.	STEEL	SURFACE	40 FT.
2	20 IN.	40 FT	506 FT.	14 IN.	STEEL	SURFACE	500 FT.
3	12 1/4 IN.	506 FT.	TOTAL DEPTH				

COMMENTS:

.

Tool Summary:

Date	11-10-17 / 2-8-17	**Date**	11-10-17 / 12-8-17	**Date**	11-10-17 / 12-8-17
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	MSI COMBO TOOL	**Tool Model**	MSI E-LOG 40GRP	**Tool Model**	MSI 60MM SONIC
Tool SN	5543	**Tool SN**	5019	**Tool SN**	5001/ 5050
From	SURFACE	**From**	SURFACE	**From**	SURFACE
To	1220 FT.	**To**	1220 FT.	**To**	1220 FT.
Recorded By	A. OLSON	**Recorded By**	A. OLSON	**Recorded By**	A. OLSON
Truck No	200	**Truck No**	200	**Truck No**	200
Operation Check	12-8-17	**Operation Check**	12-8-17	**Operation Check**	12-8-17
Calibration Check	12-8-17	**Calibration Check**	12-8-17	**Calibration Check**	N/A
Time Logged	7:15 P.M.	**Time Logged**	8:00 P.M.	**Time Logged**	8:35 P.M.

Date	11-10-17 / 12-8-17	**Date**		**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model	MSI DEVIATION	**Tool Model**		**Tool Model**	
Tool SN	6002 / 3082	**Tool SN**		**Tool SN**	
From	SURFACE	**From**		**From**	
To	1220 FT.	**To**		**To**	
Recorded By	A. OLSON	**Recorded By**		**Recorded By**	
Truck No	200	**Truck No**		**Truck No**	
Operation Check	12-8-17	**Operation Check**		**Operation Check**	
Calibration Check	N/A	**Calibration Check**		**Calibration Check**	
Time Logged	9:20 P.M.	**Time Logged**		**Time Logged**	

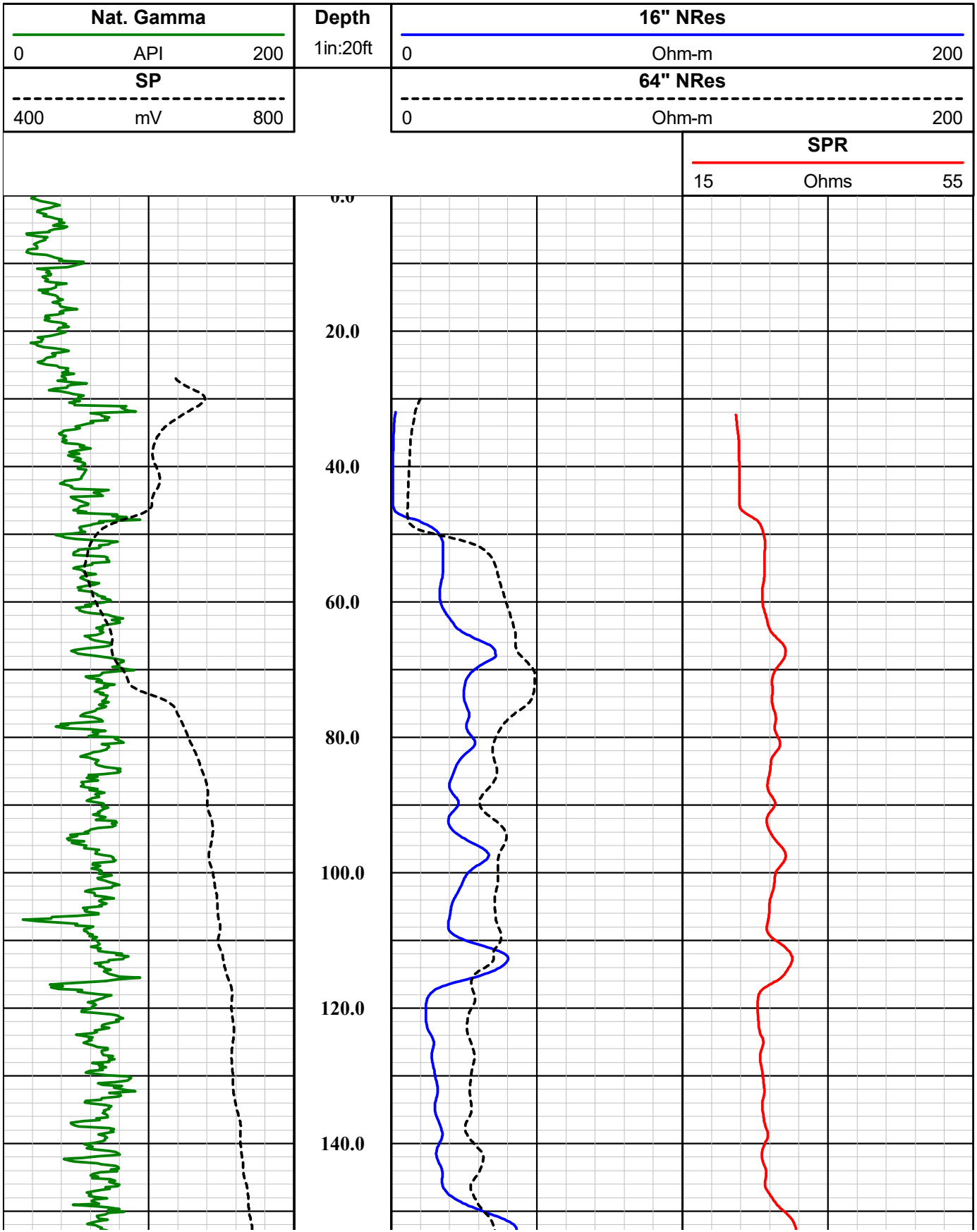
Additional Comments:

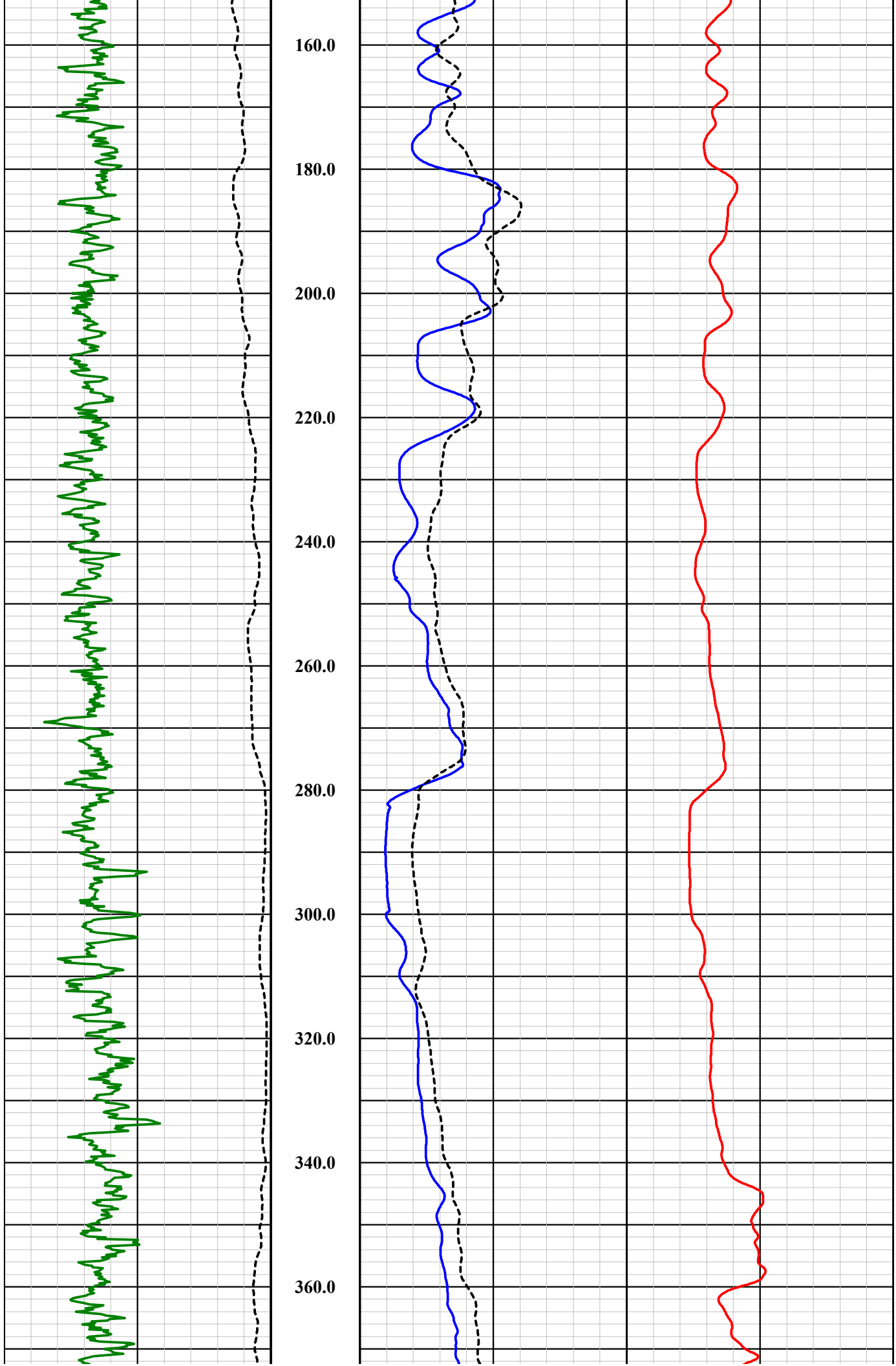
Caliper Arms Used: 15 IN. **Calibration Points:** 8 IN. & 23 IN.

E-Log Calibration Range: 1-1000 OHM-M **Calibration Points:** 1 & 1000 OHM-M

Disclaimer:

All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

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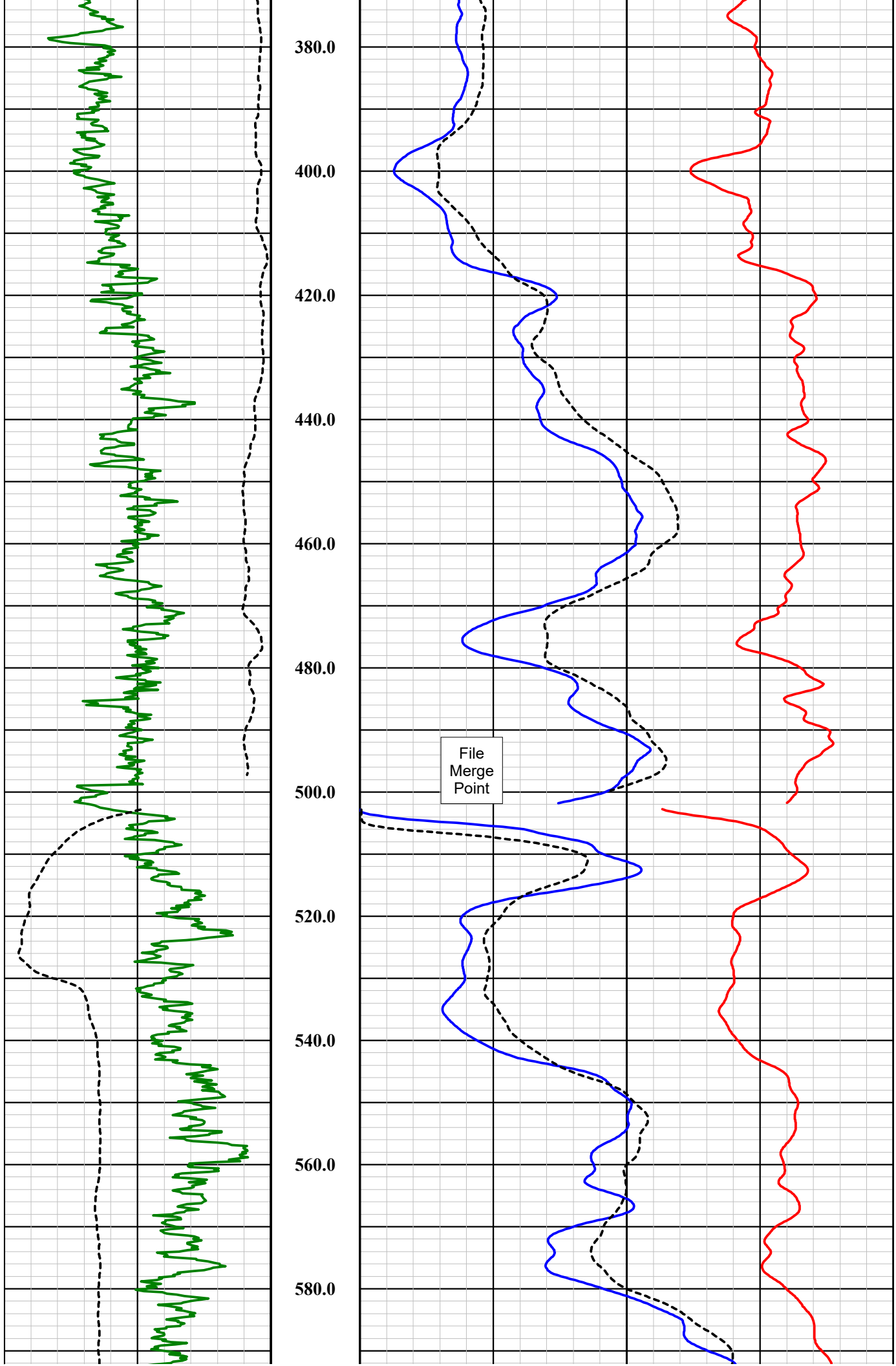
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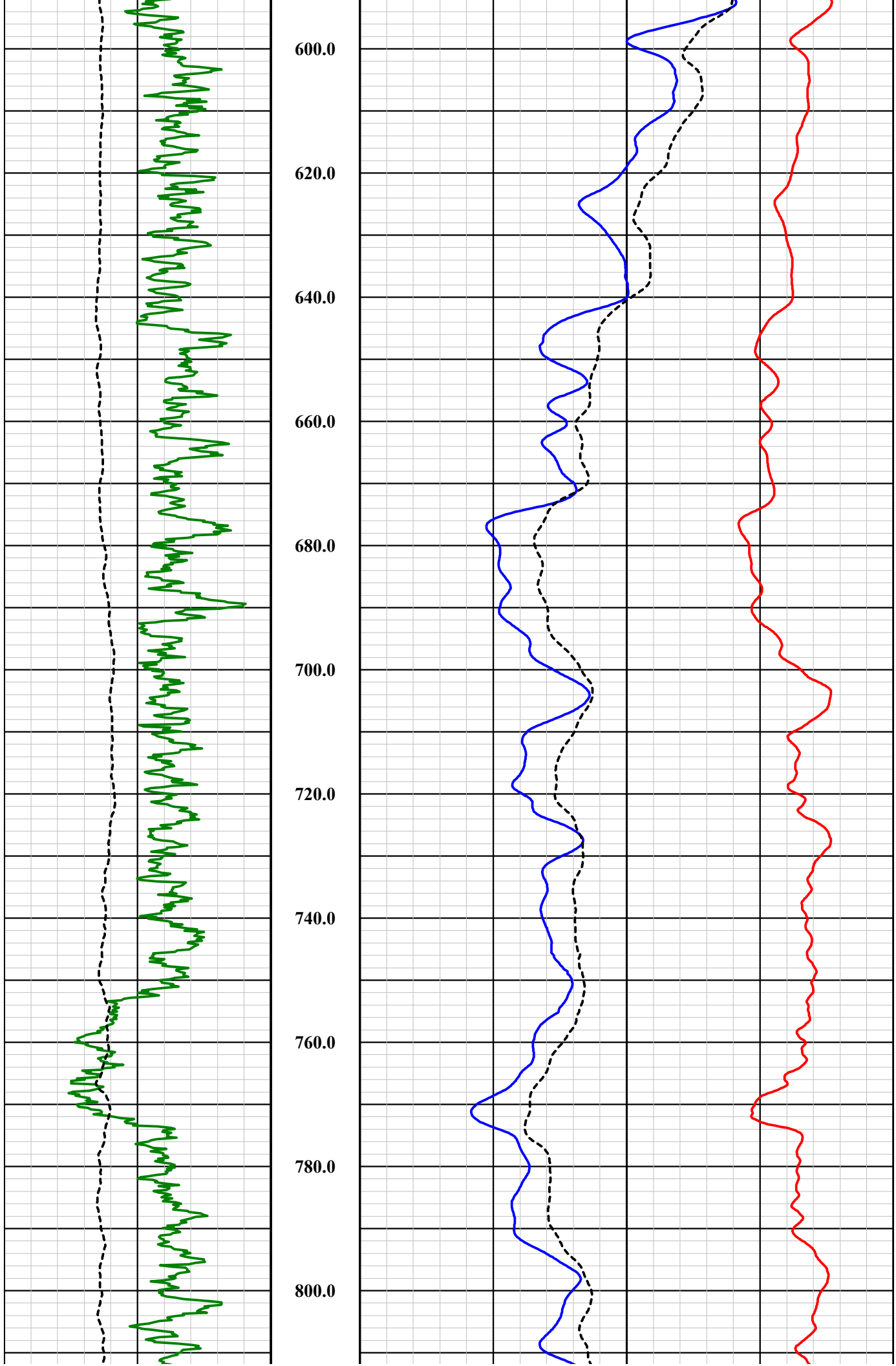
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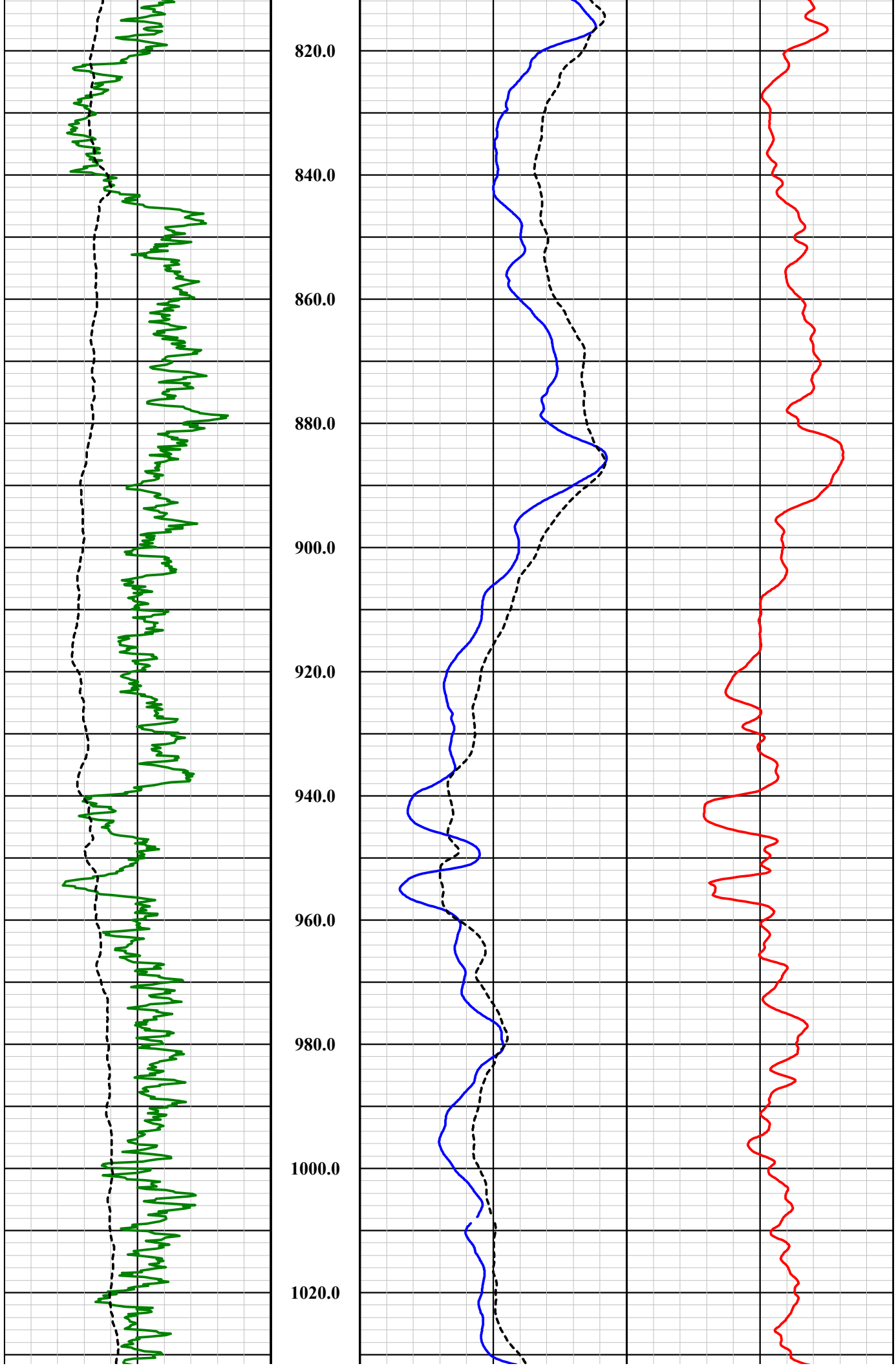
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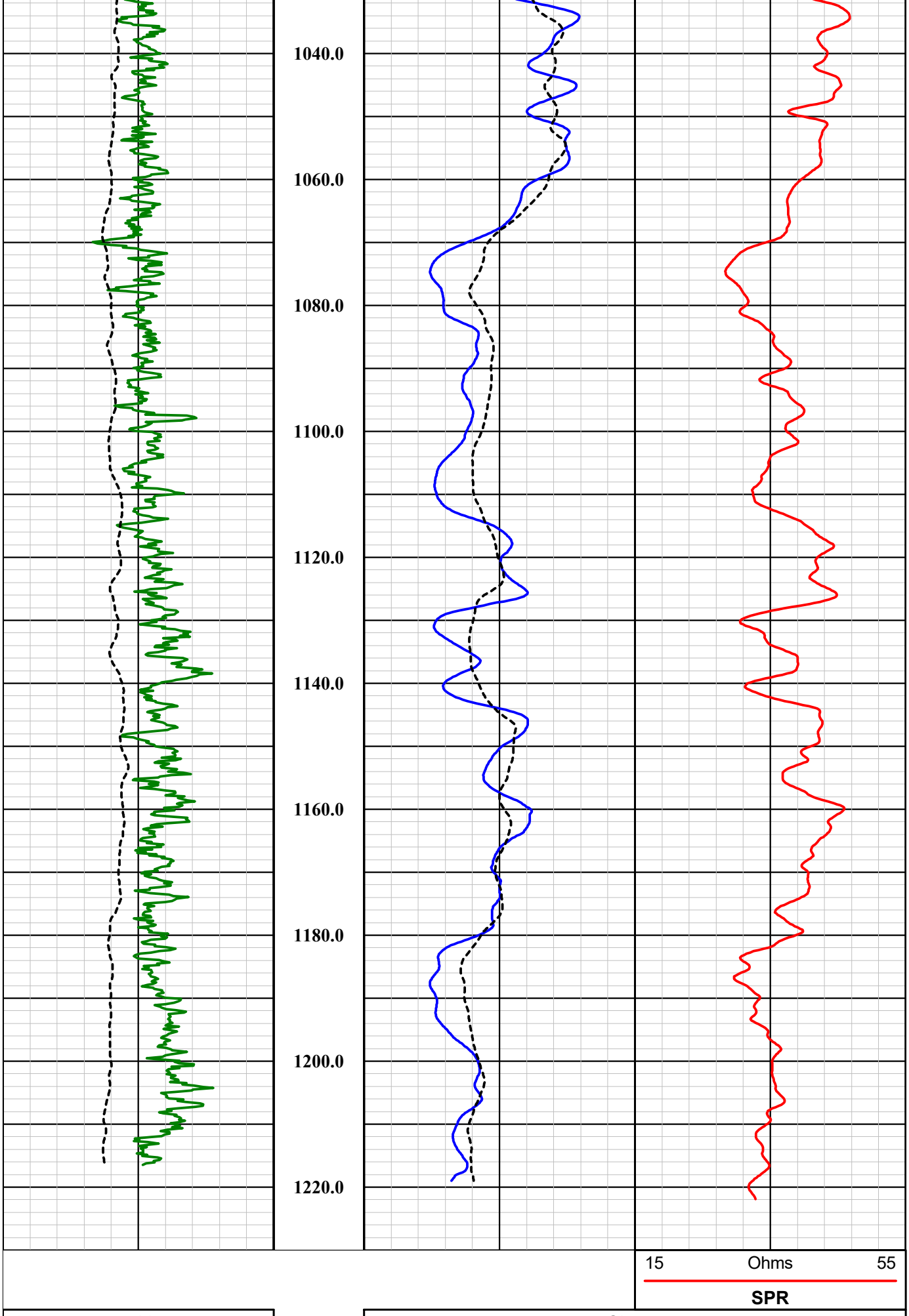
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mV
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Ohm-m
200
64" NRes
0
API
200
0
Ohm-m
200

0	API	200	1in:20ft	0	Ohm-m	200
Nat. Gamma			Depth	16" NRes		

MSI 40GRP E-Log Tool

Tool SN: 5019, 5513, & 5514

Probe Top = Depth Ref.

Four Conductor MSI Probe Top

Bridle connects to wireline cablehead: Wireline armor is the B Electrode.

Bridle Electrode (N Electrode)

Probe Length = 1.98 m or 6.5 ft
Bridle Length = 7.88 m or 25.86 ft

Probe Weight = 7.3 kg or 16.0 lbs

Can only be collected in fluid

Isolation Bridle

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

64" Normal Resistivity Electrode/Spontaneous Potential Electrode (M Electrode)

Electrode Measuring Points (from bottom of probe)

- Spontaneous Potential (SP): 1.777 m or 5.81 ft
- 16" Normal Resistivity (16" NRes): 0.3548 m or 1.16 ft
- 64" Normal Resistivity (64" NRes): 0.9644 m or 3.16 ft
- Single Point Resistance (SPR): 0.152 m or 0.50 ft
- Natural Gamma Ray (Nat. Gamma): 0.73 m or 2.39 ft

Natural Gamma Ray

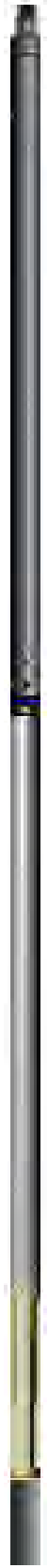
16" Normal Resistivity Electrode (M Electrode)

Current Electrode/Single Point Resistance Electrode (A Electrode)

1.63" or 40 mm Diameter (41.4 mm with neoprene heat shrink and electrical tape)

MSI Gamma-Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

NOTE: Lengths on a particular tool may vary from those listed on this document due to probe sizes and styles utilized

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	FLORENCE COPPER
Well	R-03
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Final E-Log Summary

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER
WELL ID	R-03
FIELD	FLORENCE COPPER
COUNTY	PINAL
STATE	ARIZONA

TYPE OF LOGS: GAMMA - CALIPER
MORE: TEMP. / FLUID RES.

LOCATION

SEC TWP RGE

OTHER SERVICES
E-LOG
SONIC
DEVIATION

PERMANENT DATUM	ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL	G.L.

DATE	11-10-17 / 12-8-17	TYPE FLUID IN HOLE	MUD
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	GAMMA - CALIPER - TFR	VISCOSITY	N/A
DEPTH-DRILLER	1220 FT.	LEVEL	FULL
DEPTH-LOGGER	1220 FT.	MAX. REC. TEMP.	26.02 DEG. C
BTM LOGGED INTERVAL	1220 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	A. OLSON / M. QUINONES	TOOL STRING/SN	MSI COMBO TOOL SN 5543
WITNESSED BY	SCOTT - H&A	LOG TIME:ON SITE/OFF SITE	7:00 P.M.

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN.	SURFACE	40 FT.	24 IN.	STEEL	SURFACE	40 FT.
2	20 IN.	40 FT.	506 FT.	14 IN.	STEEL	SURFACE	500 FT.
3	12 1/4 IN.	506 FT.	TOTAL DEPTH				

COMMENTS:

.

Tool Summary:

Date	11-10-17 / 12-8-17	**Date**	11-10-17 / 12-8-17	**Date**	11-10-17 / 12-8-17
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	MSI COMBO TOOL	**Tool Model**	MSI E-LOG 40GRP	**Tool Model**	MSI 60MM SONIC
Tool SN	5543	**Tool SN**	5019	**Tool SN**	5001 / 5050
From	SURFACE	**From**	SURFACE	**From**	SURFACE
To	1220 FT.	**To**	1220 FT.	**To**	1220 FT.
Recorded By	A. OLSON	**Recorded By**	A. OLSON	**Recorded By**	A. OLSON
Truck No	200	**Truck No**	200	**Truck No**	200
Operation Check	12-8-17	**Operation Check**	12-8-17	**Operation Check**	12-8-17
Calibration Check	12-8-17	**Calibration Check**	12-8-17	**Calibration Check**	N/A
Time Logged	7:15 P.M.	**Time Logged**	8:00 P.M.	**Time Logged**	8:35 P.M.

Date	11-10-17 / 12-8-17	**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model	MSI DEVIATION	**Tool Model**		**Tool Model**	
Tool SN	6002 / 3082	**Tool SN**		**Tool SN**	
From	SURFACE	**From**		**From**	
To	1220 FT.	**To**		**To**	
Recorded By	A. OLSON	**Recorded By**		**Recorded By**	
Truck No	200	**Truck No**		**Truck No**	
Operation Check	12-8-17	**Operation Check**		**Operation Check**	
Calibration Check	N/A	**Calibration Check**		**Calibration Check**	
Time Logged	9:20 P.M.	**Time Logged**		**Time Logged**	

Additional Comments:

Caliper Arms Used: 15 IN. **Calibration Points:** 8 IN. & 23 IN.

E-Log Calibration Range: 1-1000 OHM-M **Calibration Points:** 1 & 1000 OHM-M

Disclaimer:

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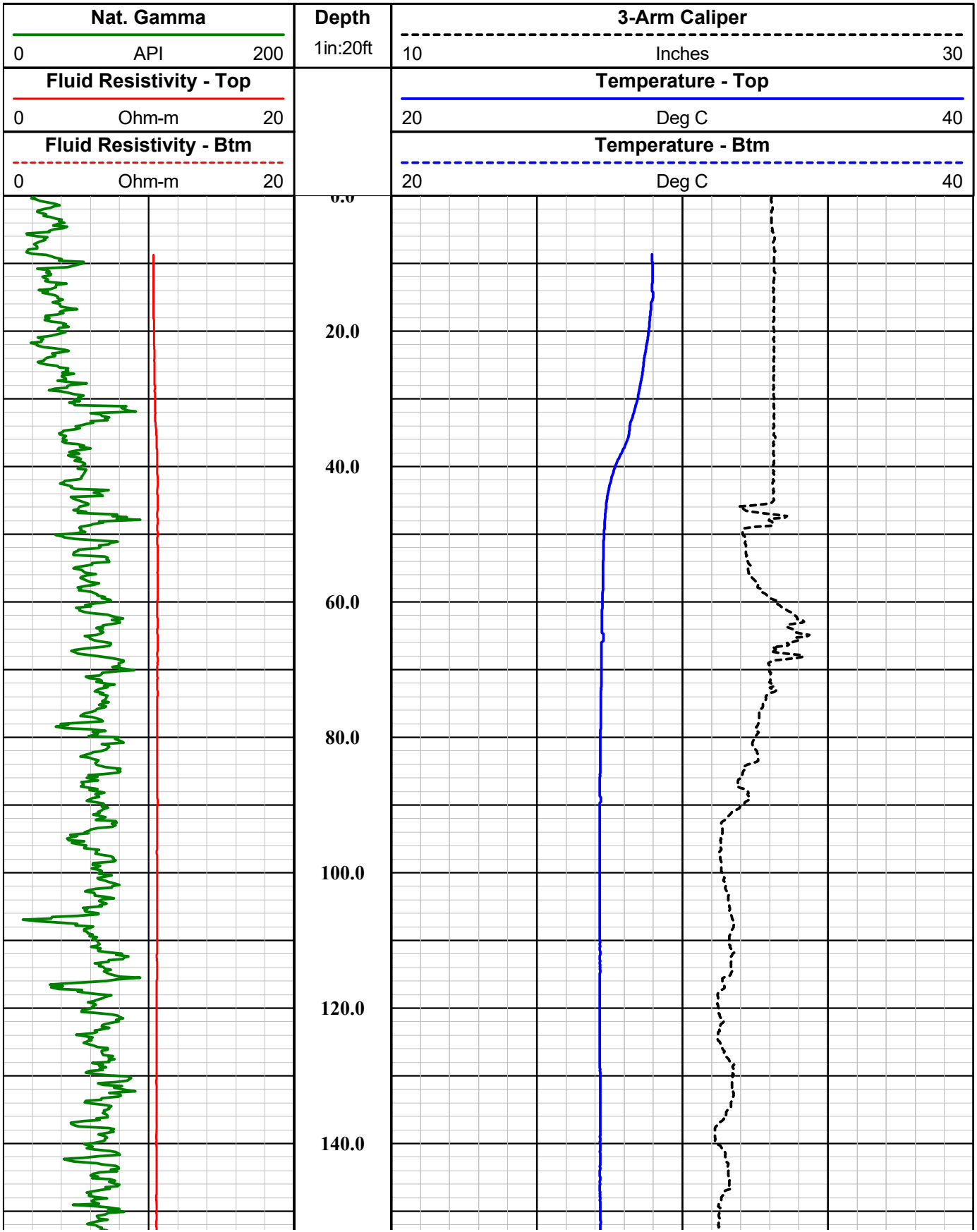

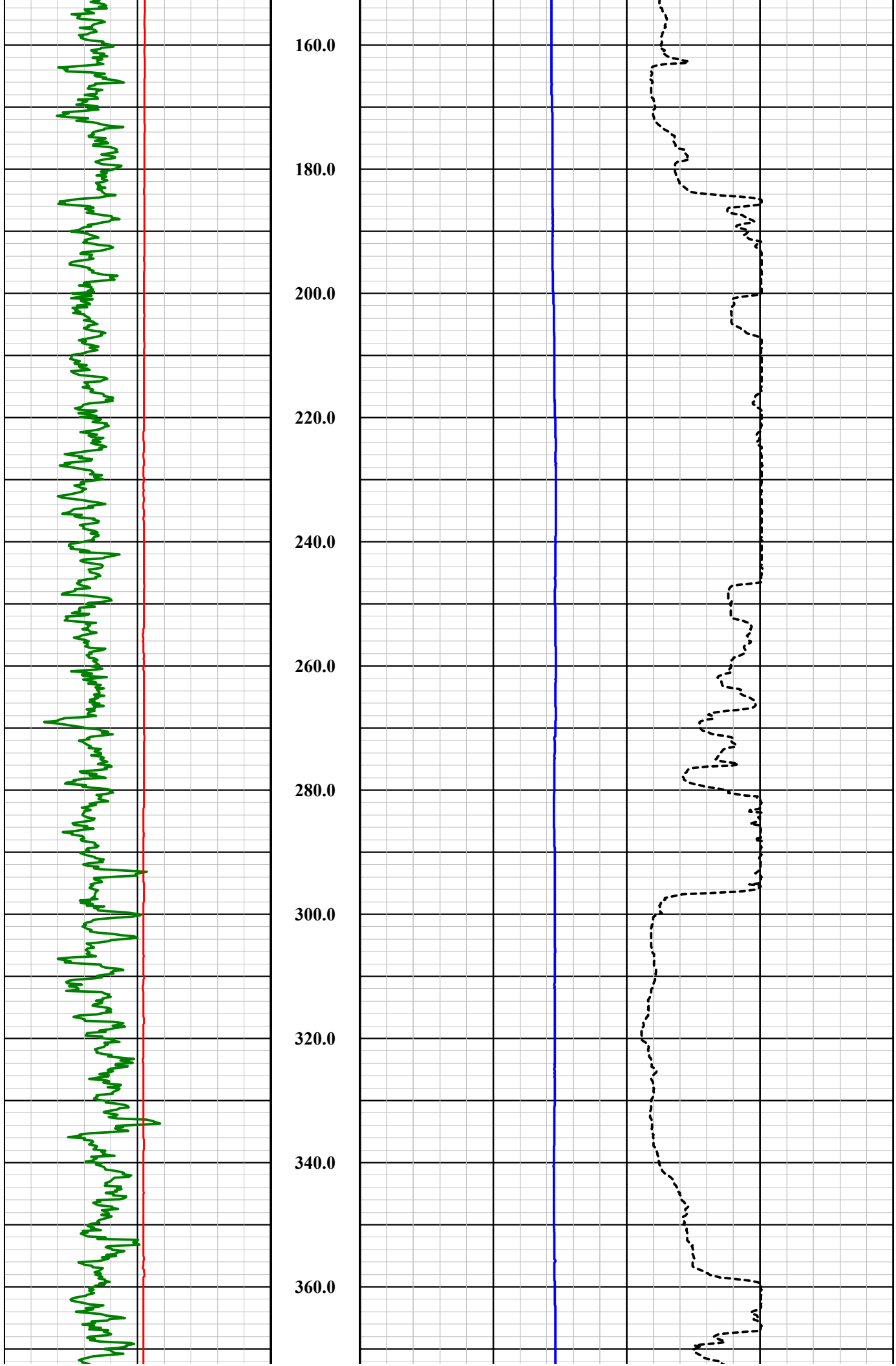
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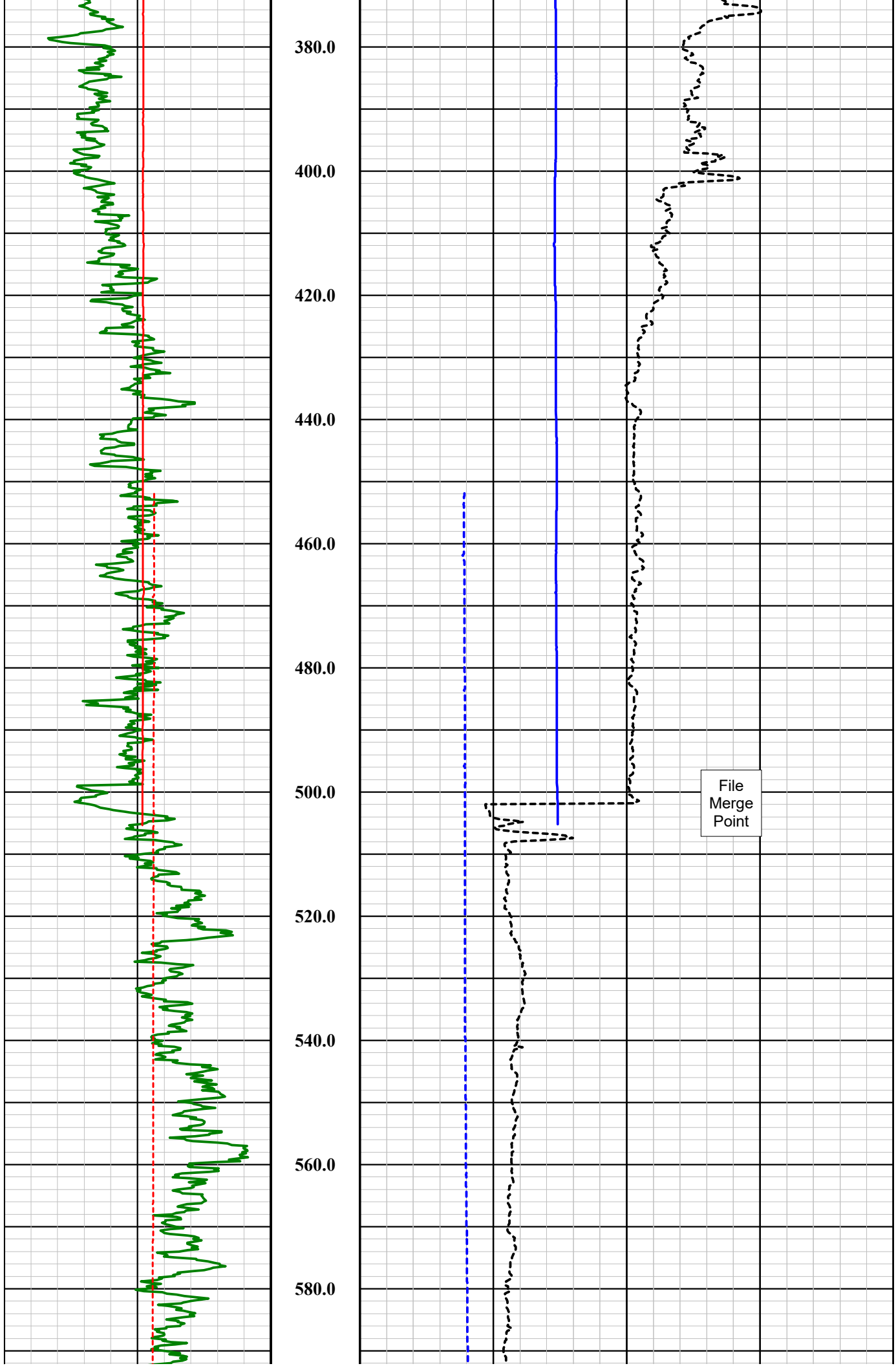
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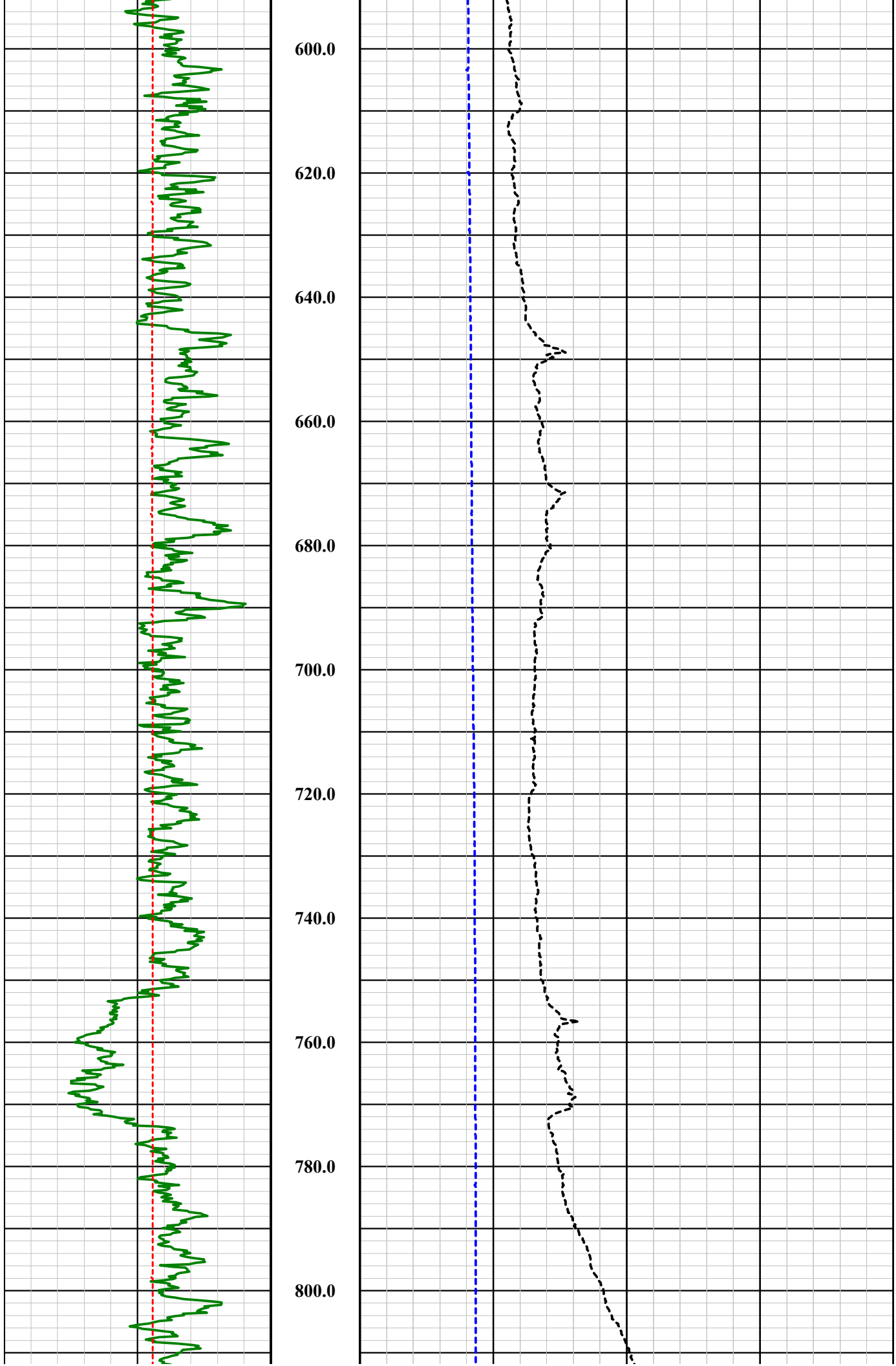
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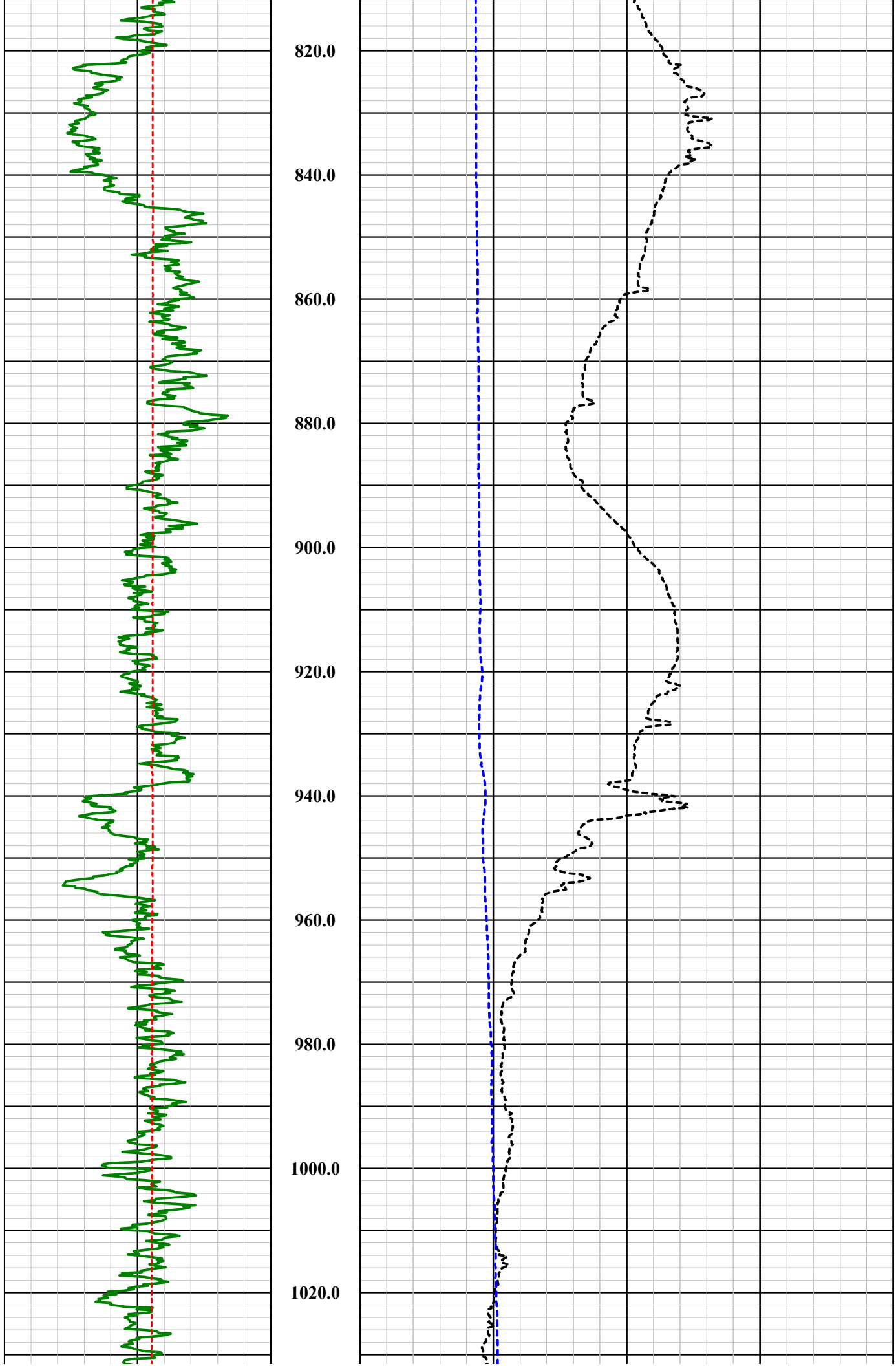
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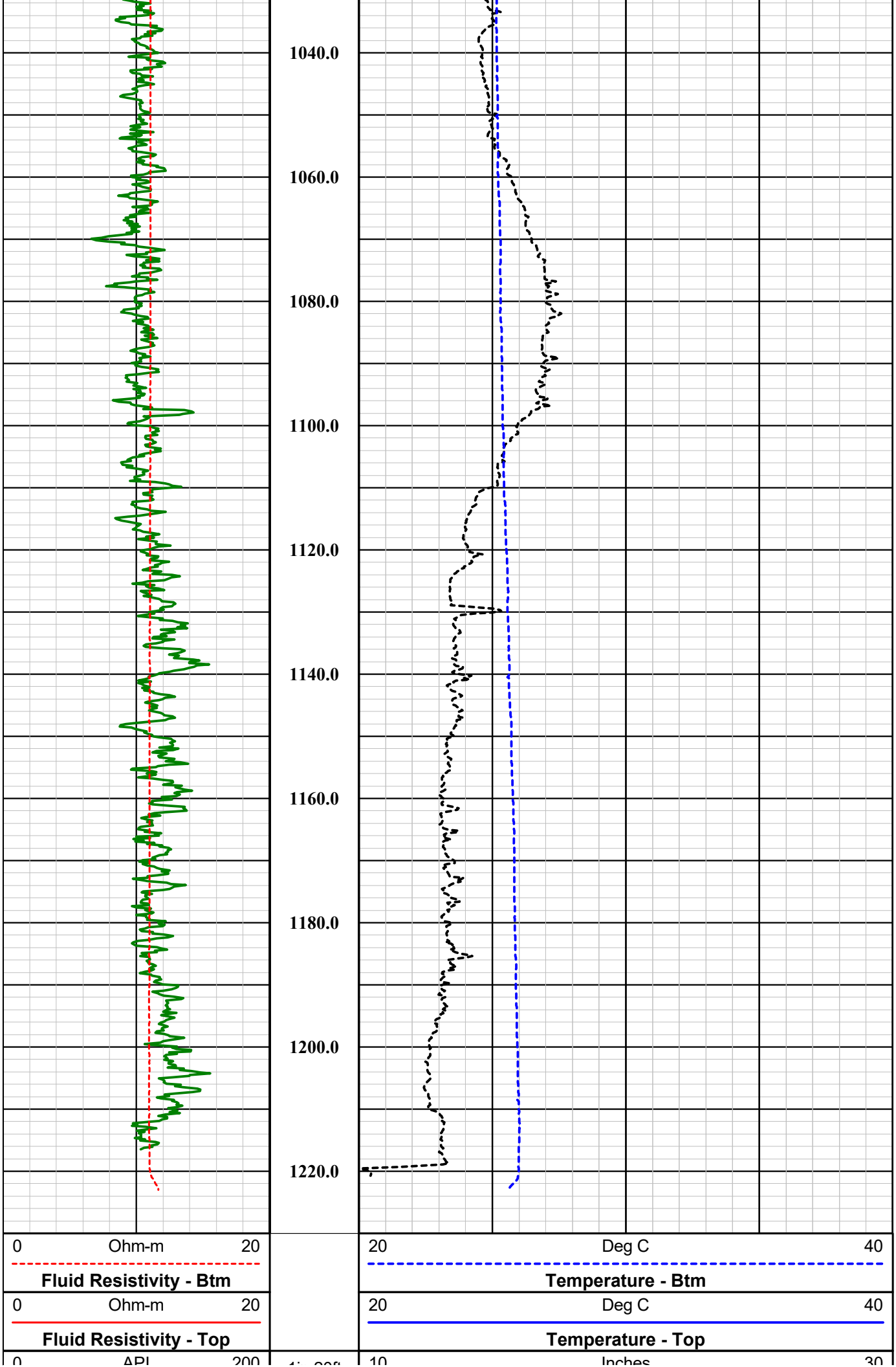
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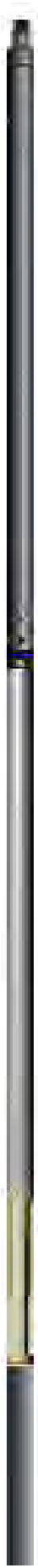
Fluid Resistivity - Btm
0
Ohm-m
20
Fluid Resistivity - Top
0
API
200
20
Deg C
40
Temperature - Btm
20
Deg C
40
Temperature - Top
10
Inches
30

Nat. Gamma	Depth	3-Arm Caliper
0 API 200	1in:20ft	10 Inches 30

MSI Gamma-Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

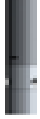
NOTE: Lengths on a particular tool may vary from those listed on this document due to probe sizes and styles utilized

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)



1.375" or 34.9 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	FLORENCE COPPER
Well	R-03
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Final GCT Summary

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER
WELL ID	R-03
FIELD	FLORENCE COPPER
COUNTY	PINAL
STATE	ARIZONA

TYPE OF LOGS: 60mm SONIC
MORE: GAMMA - CALIPER

LOCATION

SEC TWP RGE

OTHER SERVICES
E-LOG
TEMPERATURE
FLUID RESISTIVITY
DEVIATION

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	11-10-17 / 12-8-17	TYPE FLUID IN HOLE	MUD
RUN No	1 & 3	MUD WEIGHT	N/A
TYPE LOG	SONIC - GAMMA - CALIPER	VISCOSITY	N/A
DEPTH-DRILLER	1220 FT.	LEVEL	FULL
DEPTH-LOGGER	1220 FT.	MAX. REC. TEMP.	26.02 DEG. C
BTM LOGGED INTERVAL	1220 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.25 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	A. OLSON / M. QUINONES	TOOL STRING/SN	MSI 60mm SONIC SN 5050
WITNESSED BY	SCOTT - H&A	LOG TIME:ON SITE/OFF SITE	7:00 P.M.

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN.	SURFACE	40 FT.	24 IN.	STEEL	SURFACE	40 FT.
2	20 IN.	40 FT.	506 FT.	14 IN.	STEEL	SURFACE	500 FT.
3	12 1/4 IN.	506 FT.	TOTAL DEPTH				

COMMENTS:

.

Tool Summary:

Date	11-10-17 / 12-8-17	**Date**	11-10-17 / 12-8-17	**Date**	11-10-17 / 12-8-17
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	MSI COMBO TOOL	**Tool Model**	MSI E-LOG 40GRP	**Tool Model**	MSI 60MM SONIC
Tool SN	5543	**Tool SN**	5019	**Tool SN**	5001 / 5050
From	SURFACE	**From**	SURFACE	**From**	SURFACE
To	1220 FT.	**To**	1220 FT.	**To**	1220 FT.
Recorded By	A. OLSON	**Recorded By**	A. OLSON	**Recorded By**	A. OLSON
Truck No	200	**Truck No**	200	**Truck No**	200
Operation Check	12-8-17	**Operation Check**	12-8-17	**Operation Check**	12-8-17
Calibration Check	12-8-17	**Calibration Check**	12-8-17	**Calibration Check**	N/A
Time Logged	7:15 P.M.	**Time Logged**	8:00 P.M.	**Time Logged**	8:35 P.M.

Date	11-10-17 / 12-8-17	**Date**		**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model	MSI DEVIATION	**Tool Model**		**Tool Model**	
Tool SN	6002 / 3082	**Tool SN**		**Tool SN**	
From	SURFACE	**From**		**From**	
To	1220 FT.	**To**		**To**	
Recorded By	A. OLSON	**Recorded By**		**Recorded By**	
Truck No	200	**Truck No**		**Truck No**	
Operation Check	12-8-17	**Operation Check**		**Operation Check**	
Calibration Check	N/A	**Calibration Check**		**Calibration Check**	
Time Logged	9:20 P.M.	**Time Logged**		**Time Logged**	

Additional Comments:

Caliper Arms Used: 15 IN. **Calibration Points:** 8 IN. & 23 IN.

E-Log Calibration Range: 1-1000 OHM-M **Calibration Points:** 1 & 1000 OHM-M

Disclaimer:

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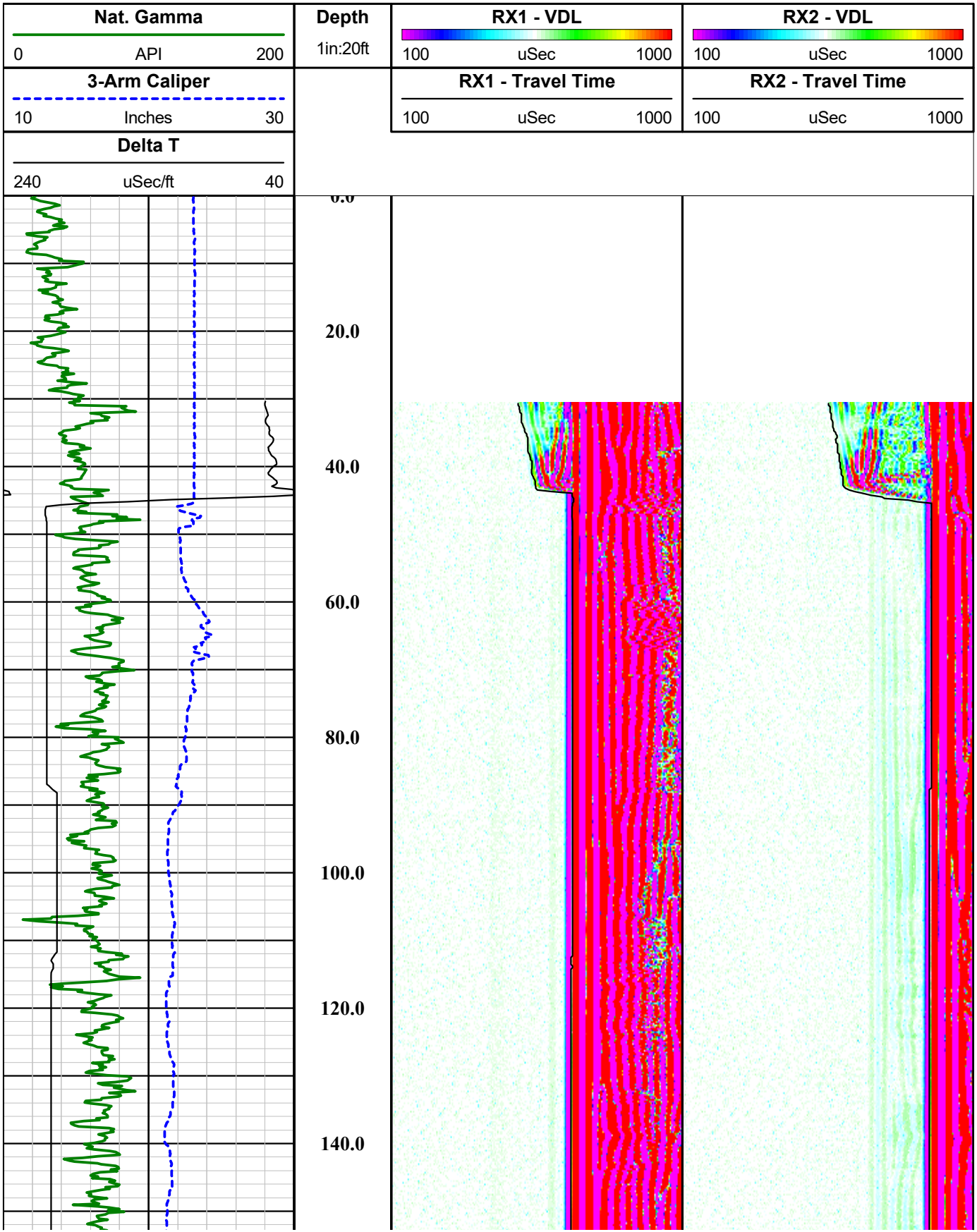

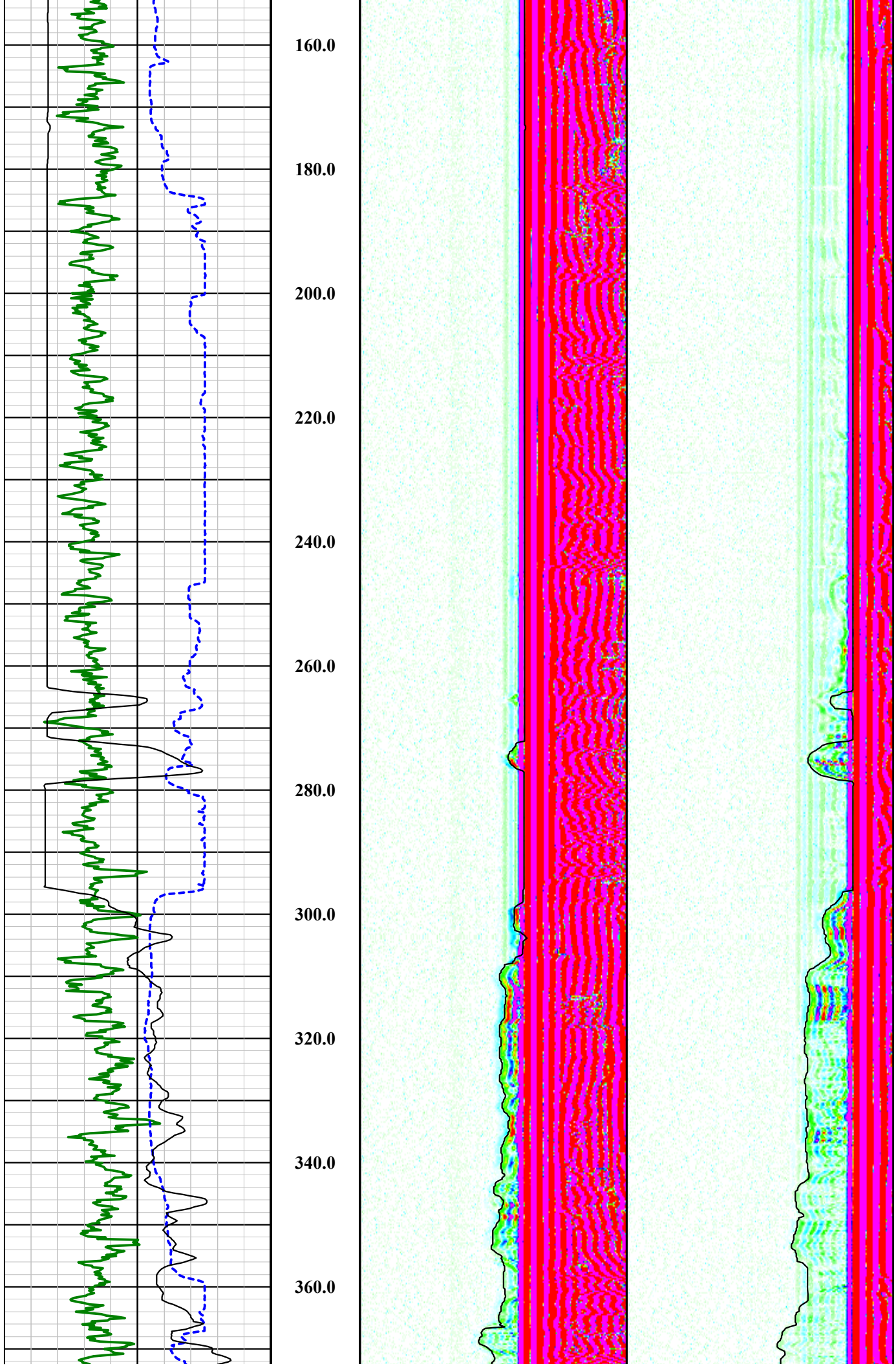
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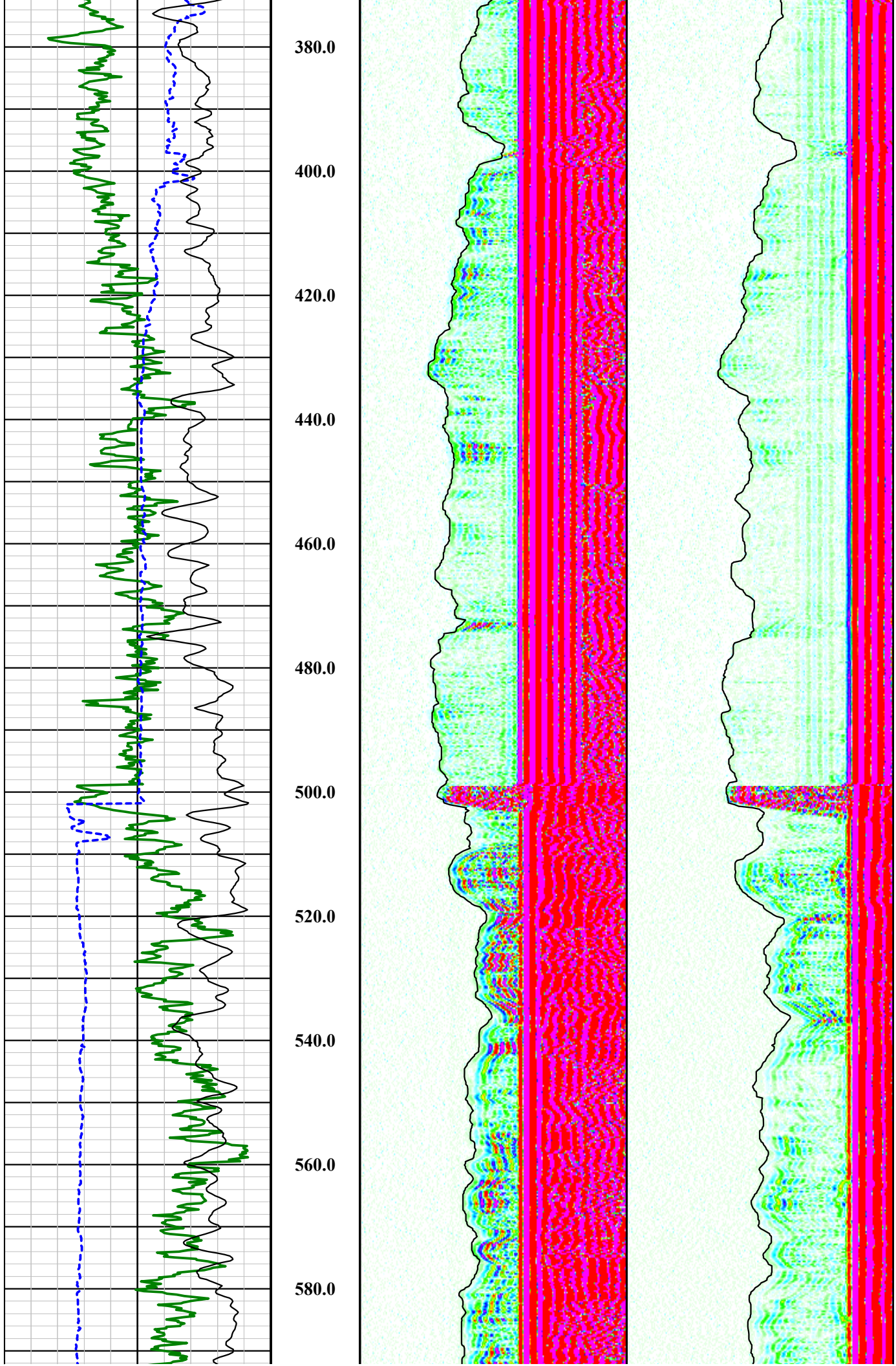
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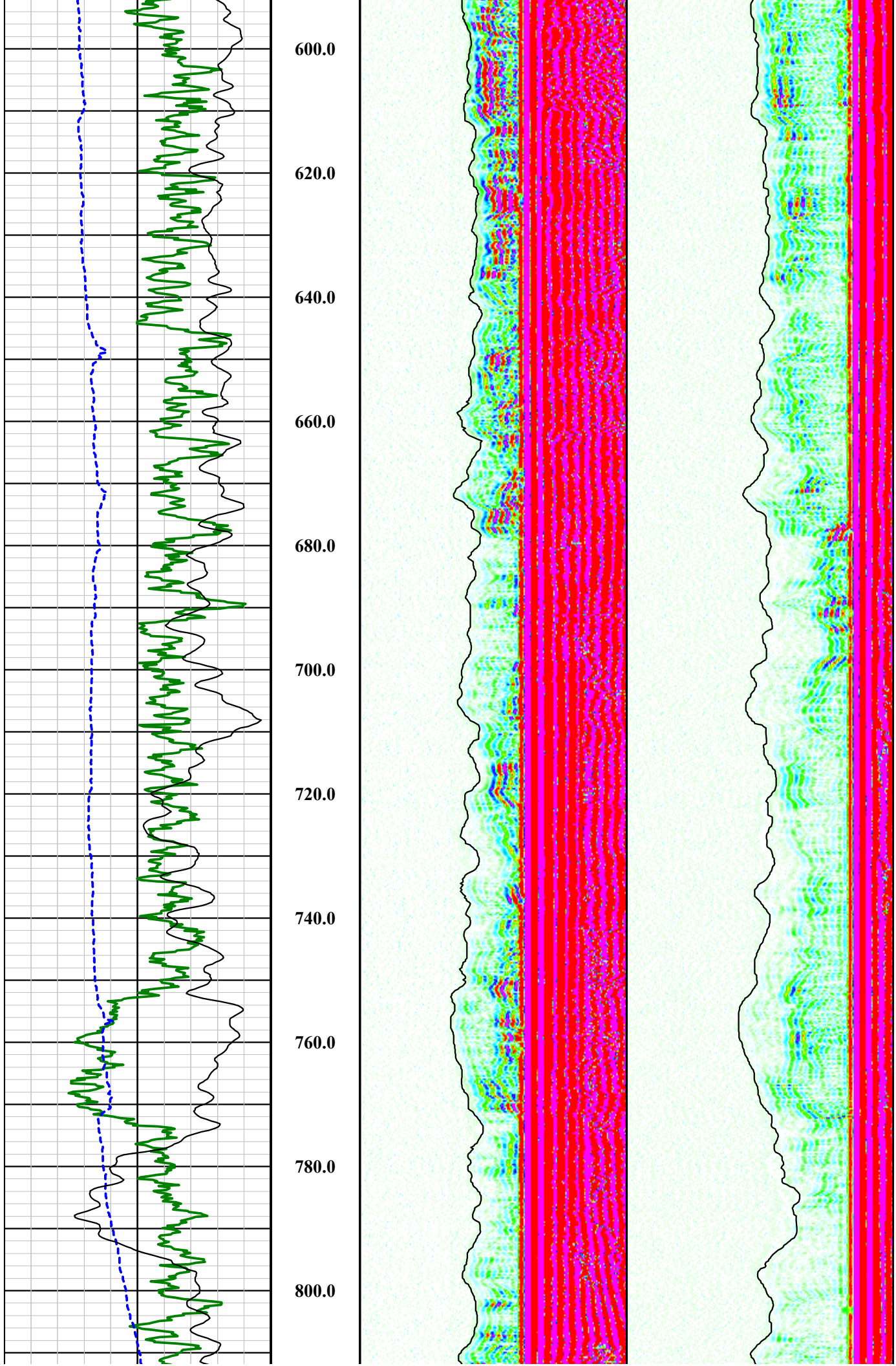
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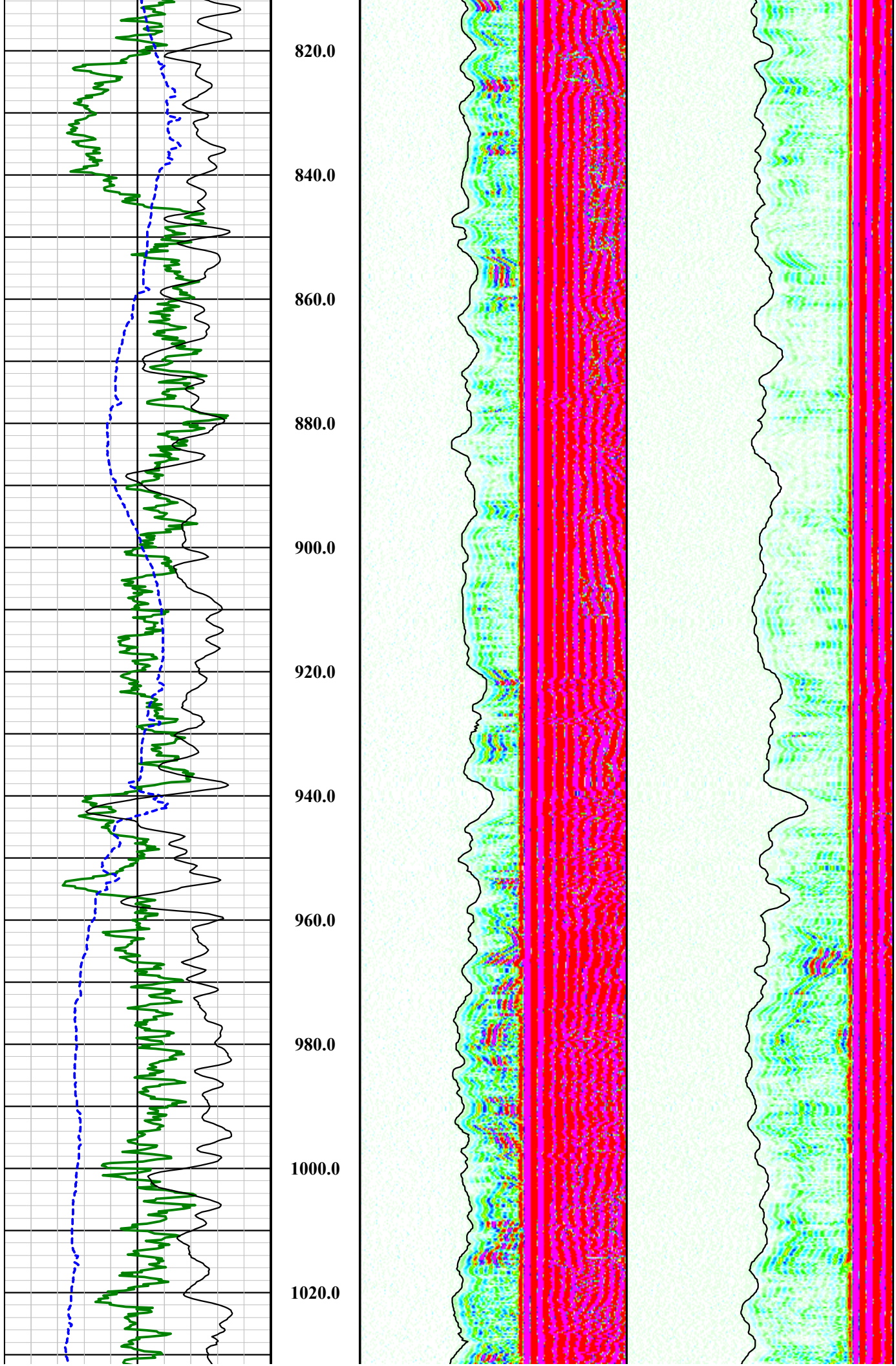
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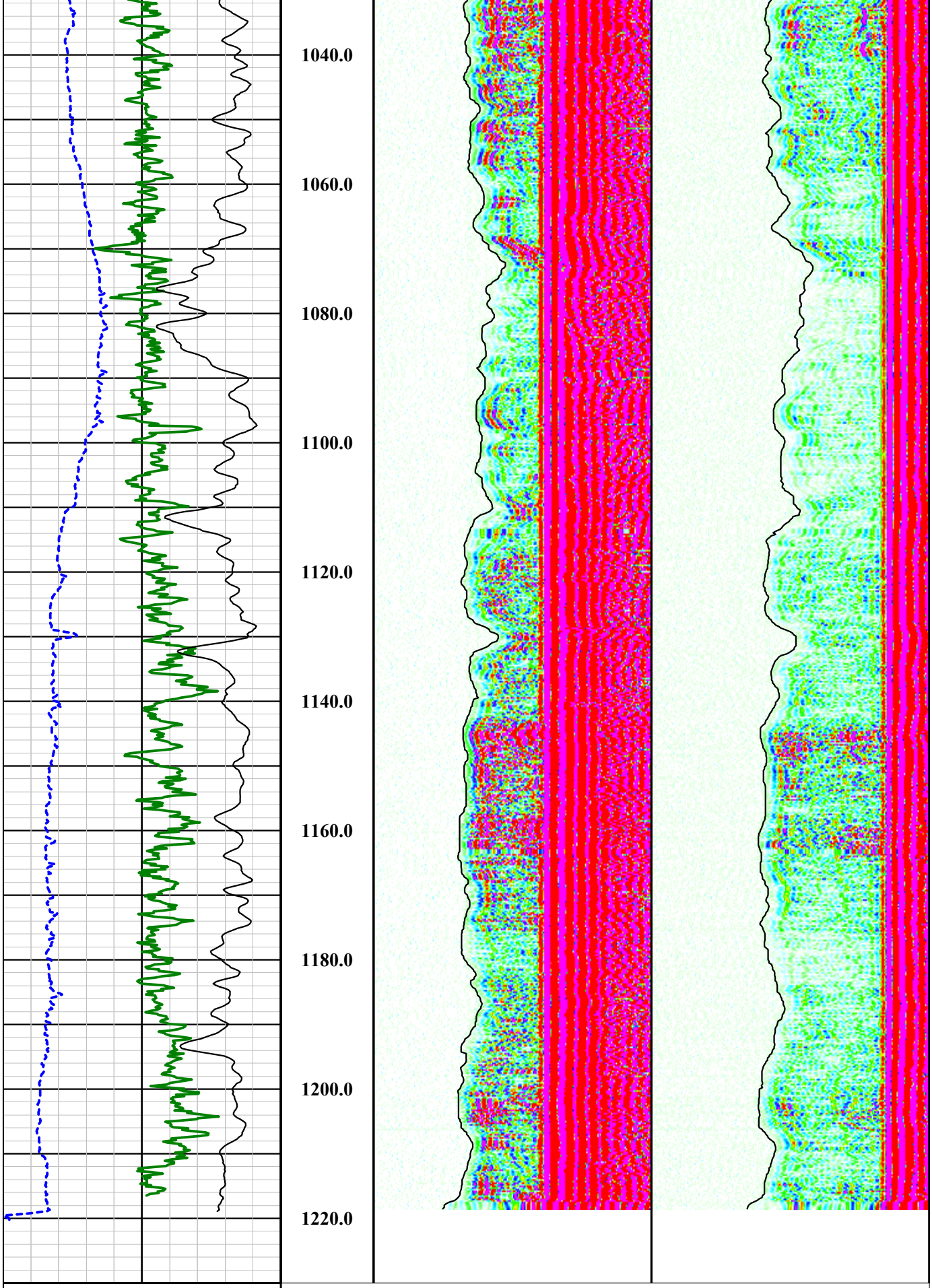


240 uSec/ft 40

Delta T

10 Inches 30

3-Arm Caliper

100 uSec 1000

RX1 - Travel Time

100 uSec 1000

RX2 - Travel Time

Nat. Gamma	Depth	RX1 - VDL	RX2 - VDL
0 API 200	1in:20ft	100 uSec 1000	100 uSec 1000

MSI 60 mm 2 RX Full Waveform Sonic Tool

Probe Top = Depth Ref.

Tool SN: 5001, 5050 & 6003

Four Conductor MSI Probe Top

Probe Length = 2.8 m or 9.19 ft
Probe Weight = ~26.5 kg or 58.4 lbs

Sensors: Ceramic Piezoelectric

Transmitter Frequency: 24 - 28 kHz resonant frequency

Rx - Rx Spacing: 0.3 m (12.0 in)

Typically centralized with external centralizers

Can only be collected in fluid

Temperature Rating: 80 Deg C (176 Deg F)
Presure Rating: 200 bar (2900 psi)

Rx-2 **Tx - Rx2 Spacing = 1.22 m (48.0 in)**

Rx-1 **Tx - Rx1 Spacing = .91 m (36.0 in)**

Acoustic Isolater

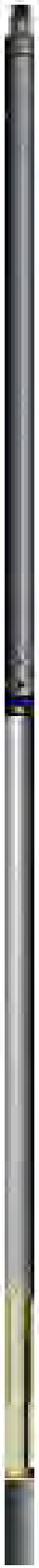
Tx = Acoustic Transmitter

0.660 m or 26.0 in. - End of tool to center of Tx

2.36 in or 60 mm Diameter

MSI Gamma-Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

NOTE: Lengths on a particular tool may vary from those listed on this document due to probe sizes and styles utilized

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	FLORENCE COPPER
Well	R-03
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Final Sonic Summary

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER
WELL ID	R-03
FIELD	FLORENCE COPPER
COUNTY	PINAL
STATE	ARIZONA

TYPE OF LOGS: 3-ARM CALIPER
MORE: W / VOL CALCULATION

LOCATION

SEC TWP RGE

OTHER SERVICES
NAT. GAMMA
TEMPERATURE
FLUID RESISTIVITY
E-LOG
SONIC
DEVIATION

PERMANENT DATUM	ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL	G.L.

DATE	11-10-17	TYPE FLUID IN HOLE	MUD
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	VOLUME CALCULATION	VISCOSITY	N/A
DEPTH-DRILLER	505 FT	LEVEL	FULL
DEPTH-LOGGER	505 FT	MAX. REC. TEMP.	28.98 Deg C
BTM LOGGED INTERVAL	505 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	M. QUINONES	TOOL STRING/SN	MSI COMBO TOOL SN 5543
WITNESSED BY	SCOTT - H&A	LOG TIME:ON SITE/OFF SITE	7:30 P.M.

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	?"	SURFACE	40 FT	24"	STEEL	SURFACE	40 FT
2	20"	40 FT	TOTAL DEPTH				
3							

COMMENTS:

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Tool Summary:

Date	11-10-17	**Date**	11-10-17	**Date**	11-10-17		
Run No.	1	**Run No.**	2	**Run No.**	3		
Tool Model	MSI COMBO TOOL	**Tool Model**	MSI E-LOG 40GRP	**Tool Model**	MSI 60MM SONIC		
Tool SN	5543	**Tool SN**	5019	**Tool SN**	5001		
From	SURFACE	**From**	SURFACE	**From**	SURFACE		
To	505 FT	**To**	503 FT	**To**	503 FT		
Recorded By	M. QUINONES	**Recorded By**	M. QUINONES	**Recorded By**	M. QUINONES		
Truck No	200	**Truck No**	200	**Truck No**	200		
Operation Check	11-10-17	**Operation Check**	11-10-17	**Operation Check**	11-10-17		
Calibration Check	11-10-17	**Calibration Check**	11-10-17	**Calibration Check**	N/A		
Time Logged	9:10 P.M.	**Time Logged**	9:40 P.M.	**Time Logged**	10:00 P.M.		

Date	11-10-17	**Date**		**Date**			
Run No.	4	**Run No.**	5	**Run No.**	6		
Tool Model	MSI DEVIATION	**Tool Model**		**Tool Model**			
Tool SN	6002	**Tool SN**		**Tool SN**			
From	SURFACE	**From**		**From**			
To	503 FT	**To**		**To**			
Recorded By	M. QUINONES	**Recorded By**		**Recorded By**			
Truck No	200	**Truck No**		**Truck No**			
Operation Check	11-4-17	**Operation Check**		**Operation Check**			
Calibration Check	N/A	**Calibration Check**		**Calibration Check**			
Time Logged	10;40 P.M.	**Time Logged**		**Time Logged**			

Additional Comments:

Caliper Arms Used: 16" **Calibration Points:** 8" & 23"

E-Log Calibration Range: 1-1000 OHM-M **Calibration Points:** 1 & 1000 OHM-M

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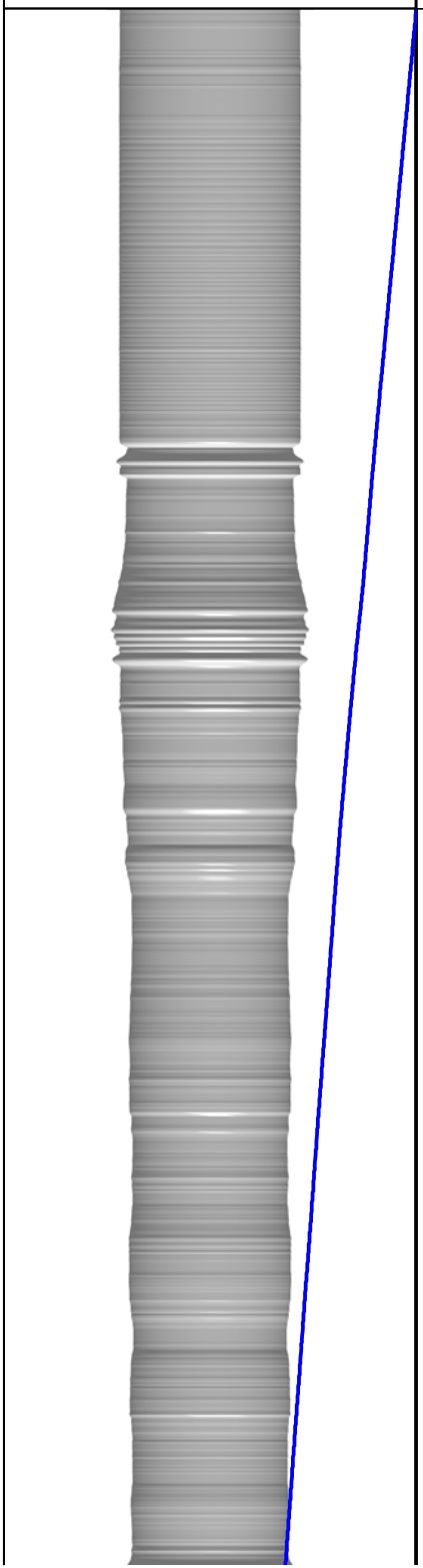
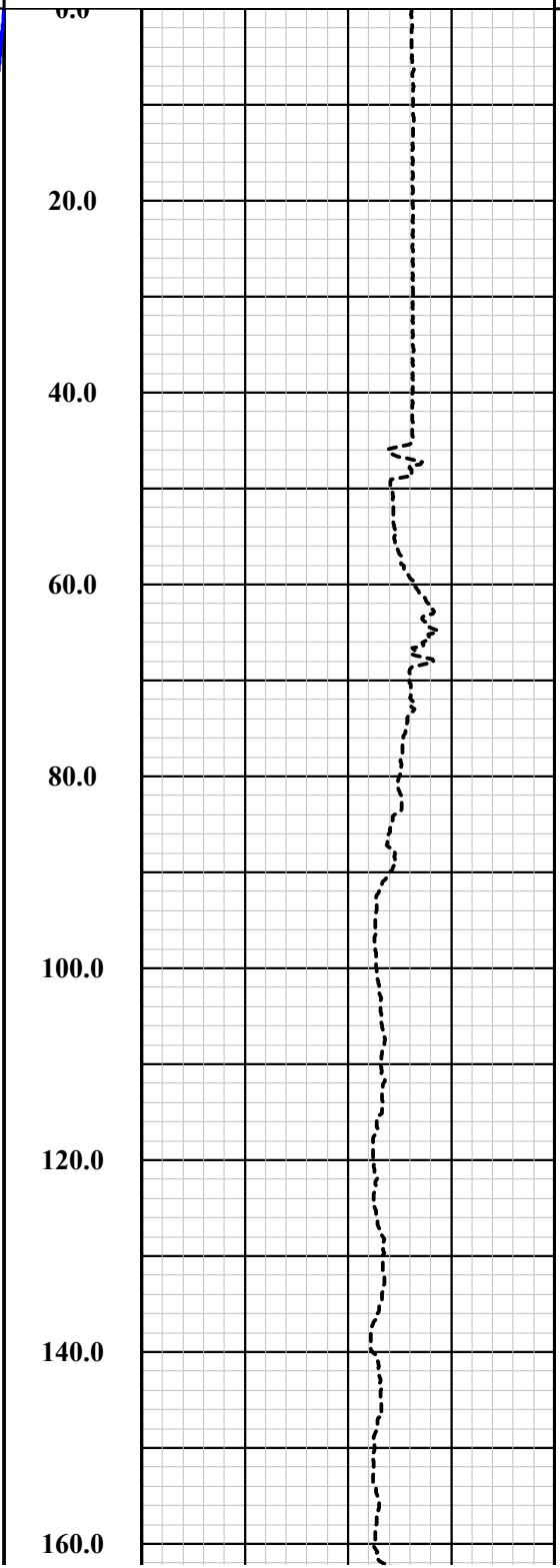
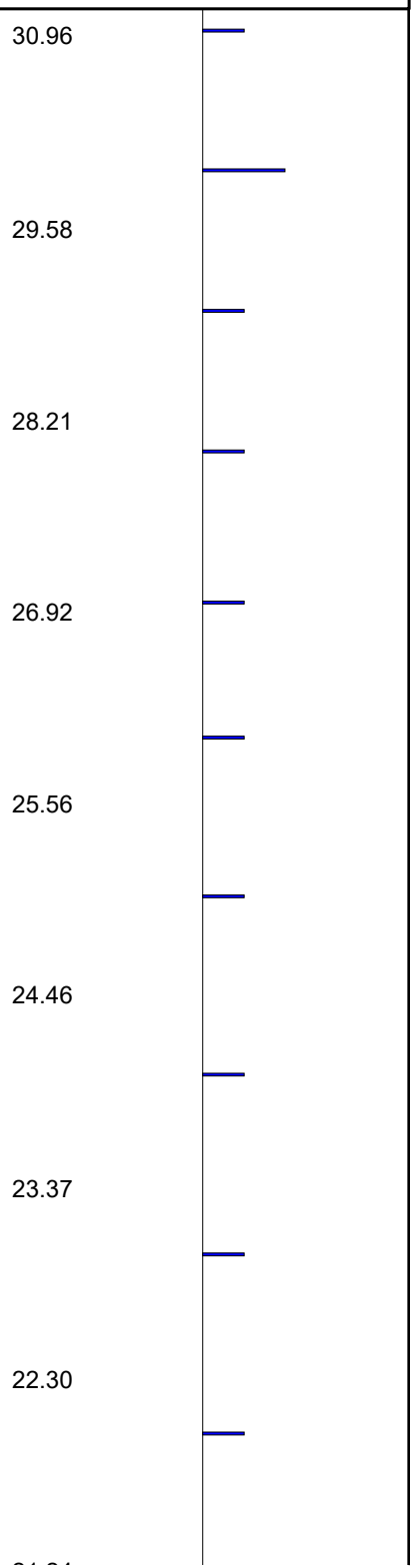
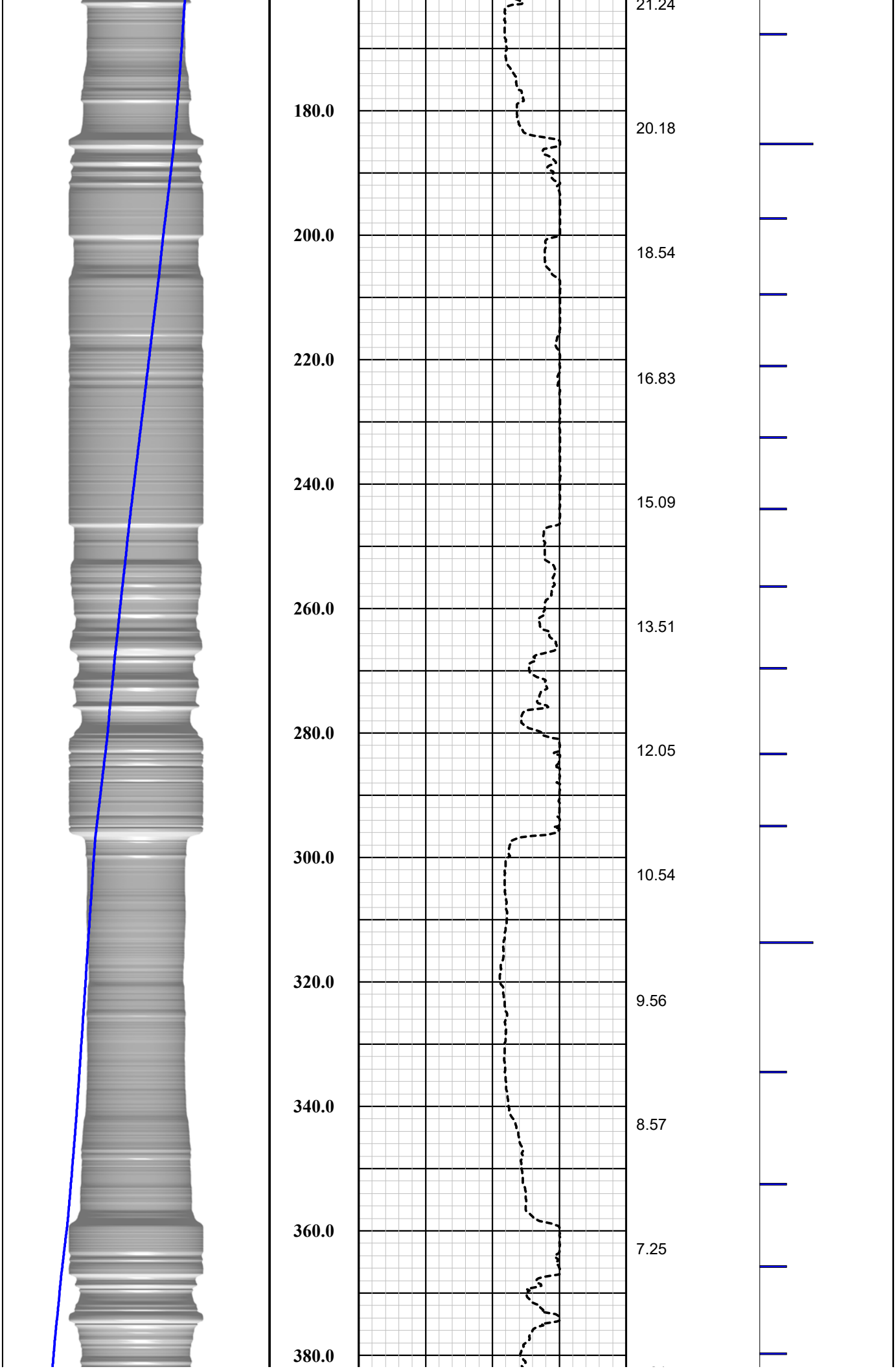
Total Volume	Depth	3-Arm Caliper	Cumulated Vol (cu.yd)
0 cu.yd 31.14	1in:20ft	10 Inches 30	
3-D View			Based on 10.75" OD Casing
0°			





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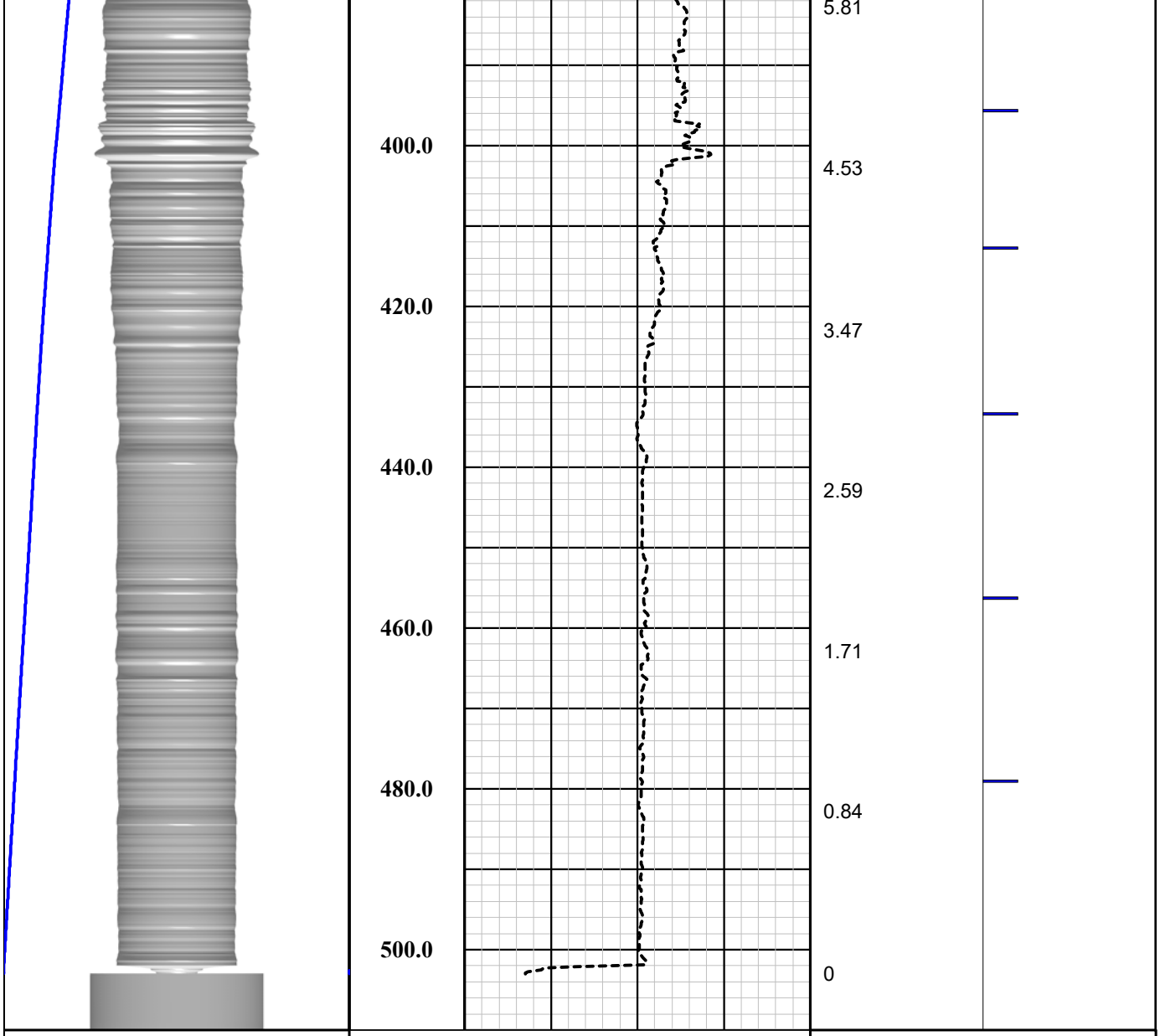
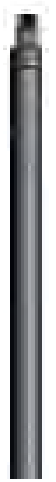


MSI Gamma-Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



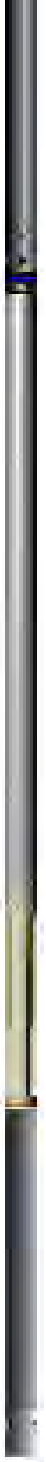
Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)
Presure Rating: 200 bar (2900 psi)



Natural Gamma Ray = 0.76 m (29.75 in)

NOTE: Lengths on a particular tool may vary from those listed on this document due to probe sizes and styles utilized

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	FLORENCE COPPER
Well	R-03
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Final Caliper w / Volume Calculation Summary

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	R-03		
FIELD	FLORENCE COPPER		
COUNTY	PINAL	STATE	ARIZONA

TYPE OF LOGS: 3-ARM CALIPER
MORE: W / VOLUME CALC.

LOCATION

SEC TWP RGE

OTHER SERVICES
E-LOG
SONIC
DEVIATION
NAT. GAMMA
TEMPERATURE
FLUID RESISTIVITY

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	12-8-17	TYPE FLUID IN HOLE	MUD
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	VOLUME CALCULATION	VISCOSITY	N/A
DEPTH-DRILLER	1220 FT.	LEVEL	FULL
DEPTH-LOGGER	1220 FT.	MAX. REC. TEMP.	26.02 DEG. C
BTM LOGGED INTERVAL	1220 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	450 FT.	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	A. OLSON / M. QUINONES	TOOL STRING/SN	MSI COMBO TOOL SN 5543
WITNESSED BY	SCOTT - H&A	LOG TIME:ON SITE/OFF SITE	7:00 P.M.

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	? IN.	SURFACE	40 FT.	24 IN.	STEEL	SURFACE	40 FT.
2	20 IN.	40 FT.	506 FT.	14 IN.	STEEL	SURFACE	500 FT.
3	12 1/4 IN.	506 FT.	TOTAL DEPTH				

COMMENTS:

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Tool Summary:

Date	12-8-17	**Date**	12-8-17	**Date**	12-8-17		
Run No.	1	**Run No.**	2	**Run No.**	3		
Tool Model	MSI COMBO TOOL	**Tool Model**	MSI E-LOG 40GRP	**Tool Model**	MSI 60MM SONIC		
Tool SN	5543	**Tool SN**	5019	**Tool SN**	5050		
From	450 FT.	**From**	450 FT.	**From**	450 FT.		
To	1220 FT.	**To**	1220 FT.	**To**	1220 FT.		
Recorded By	A. OLSON	**Recorded By**	A. OLSON	**Recorded By**	A. OLSON		
Truck No	200	**Truck No**	200	**Truck No**	200		
Operation Check	12-8-17	**Operation Check**	12-8-17	**Operation Check**	12-8-17		
Calibration Check	12-8-17	**Calibration Check**	12-8-17	**Calibration Check**	N/A		
Time Logged	7:15 P.M.	**Time Logged**	8:00 P.M.	**Time Logged**	8:35 P.M.		

Date	12-8-17	**Date**		**Date**			
Run No.	4	**Run No.**	5	**Run No.**	6		
Tool Model	MSI DEVIATION	**Tool Model**		**Tool Model**			
Tool SN	3082	**Tool SN**		**Tool SN**			
From	450 FT.	**From**		**From**			
To	1220 FT.	**To**		**To**			
Recorded By	A. OLSON	**Recorded By**		**Recorded By**			
Truck No	200	**Truck No**		**Truck No**			
Operation Check	12-8-17	**Operation Check**		**Operation Check**			
Calibration Check	N/A	**Calibration Check**		**Calibration Check**			
Time Logged	9:20 P.M.	**Time Logged**		**Time Logged**			

Additional Comments:

Caliper Arms Used: 15 IN. **Calibration Points:** 8 IN. & 23 IN.

E-Log Calibration Range: 1-1000 OHM-M **Calibration Points:** 1 & 1000 OHM-M

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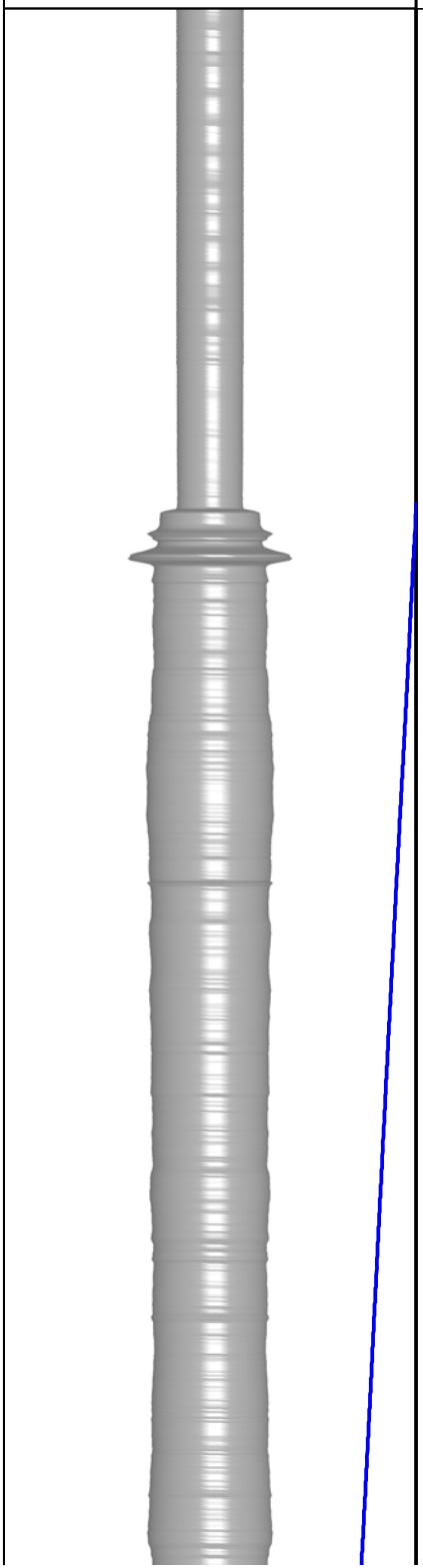
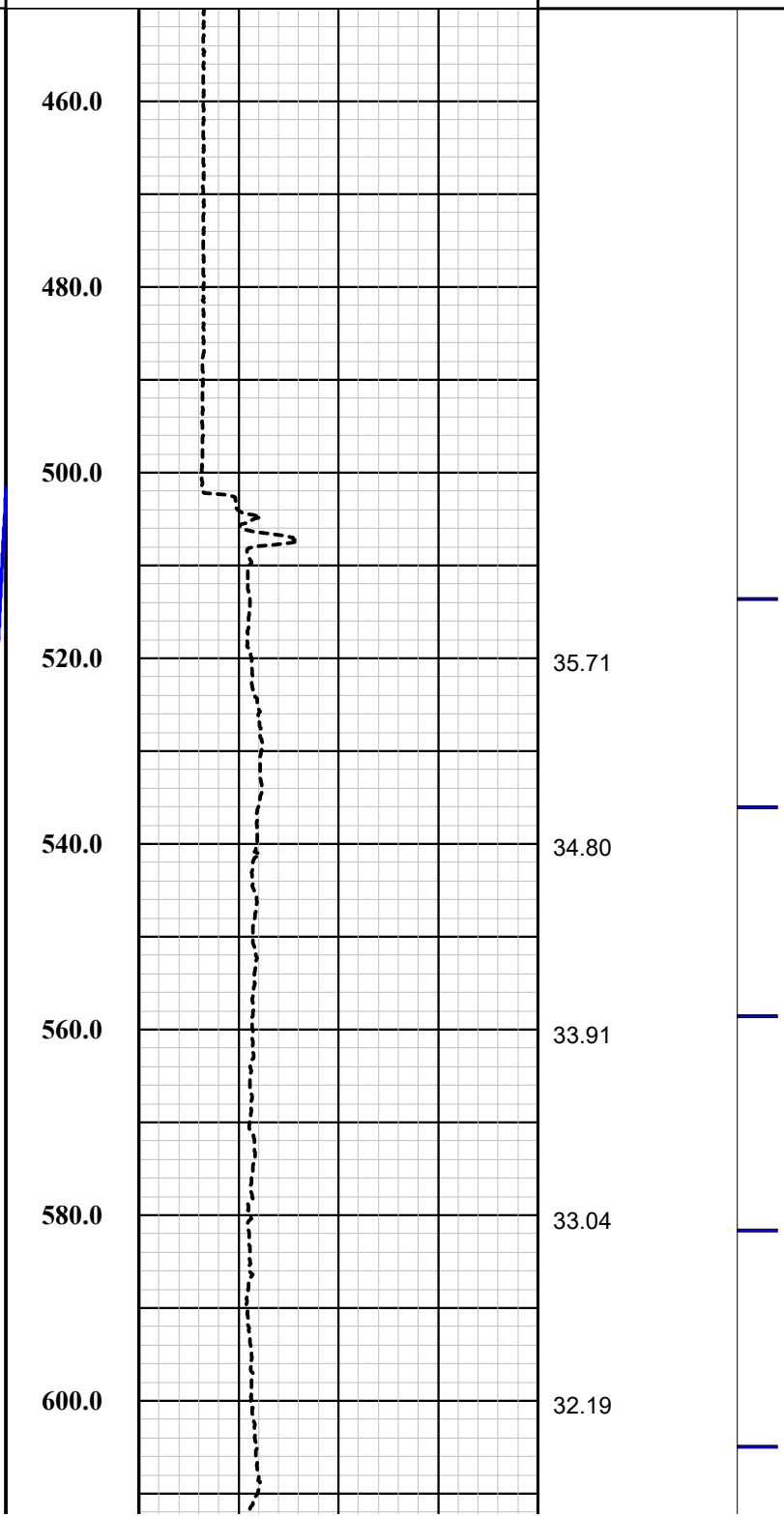
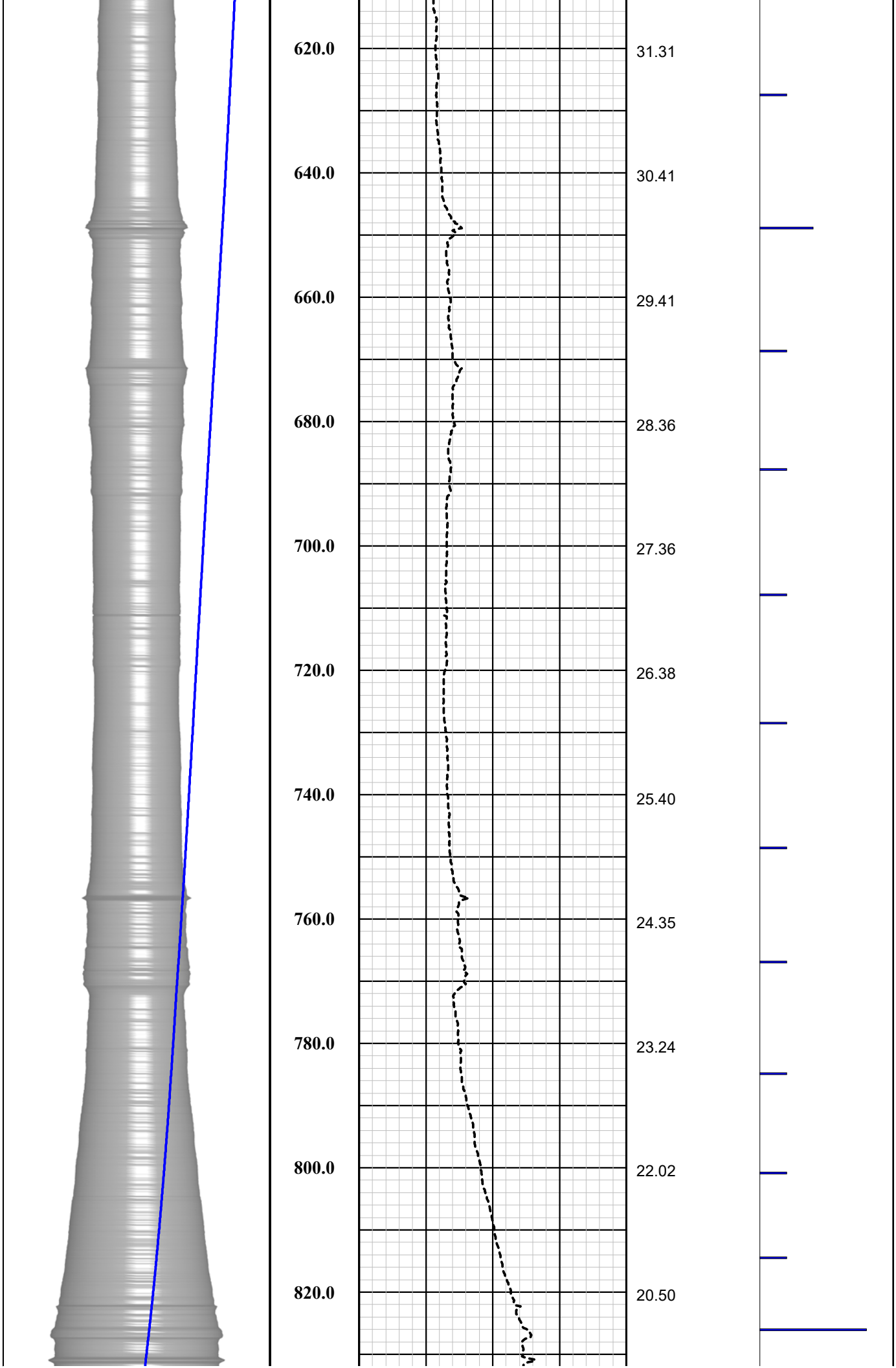
Total Volume	Depth	3-Arm Caliper	Cumulated Volume (cu.yd)
0 cu.yd 36.51	1in:20ft	10 Inches 30	
3-D View			Based on 5.5" OD Casing
-0°			



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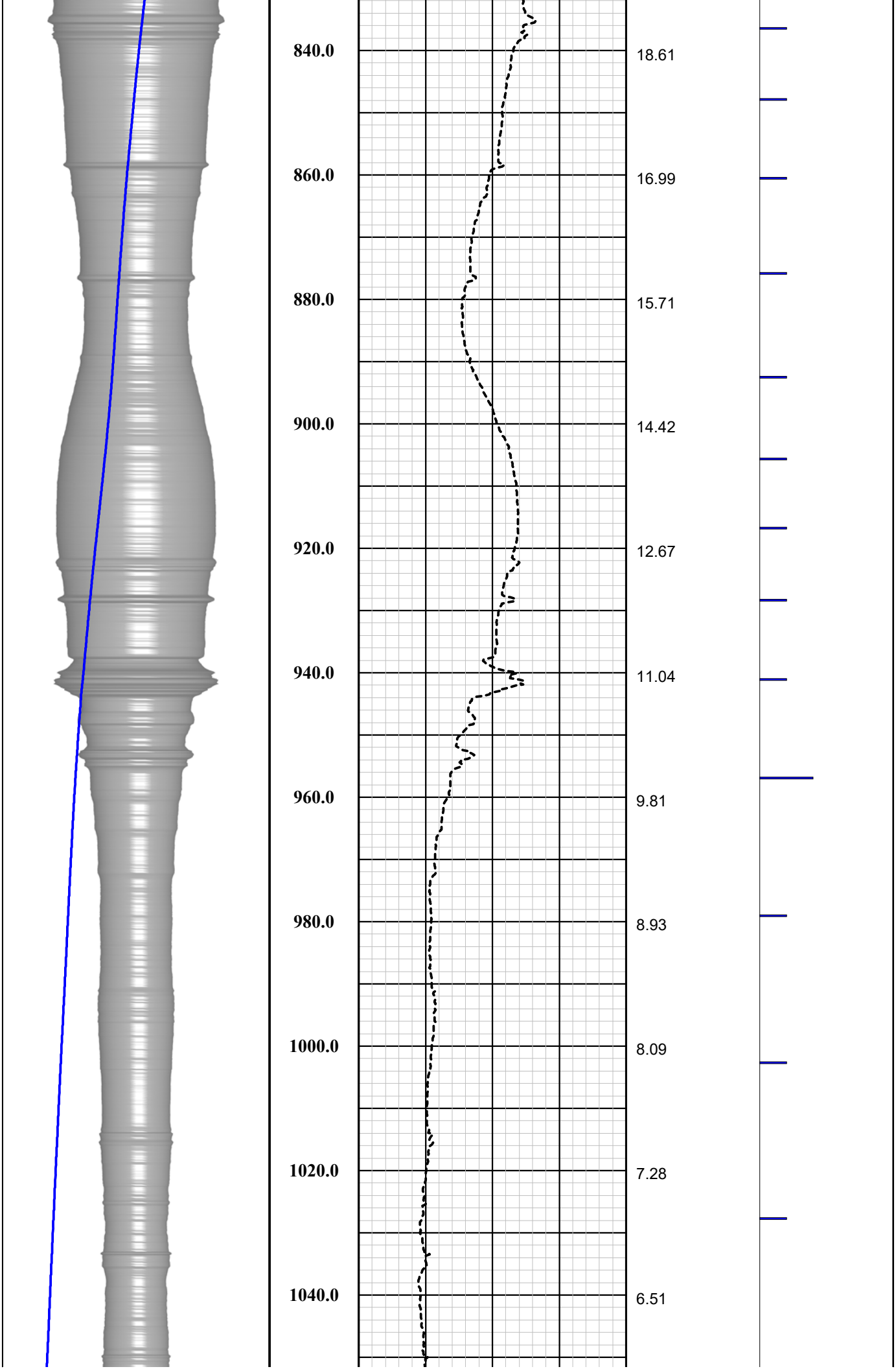
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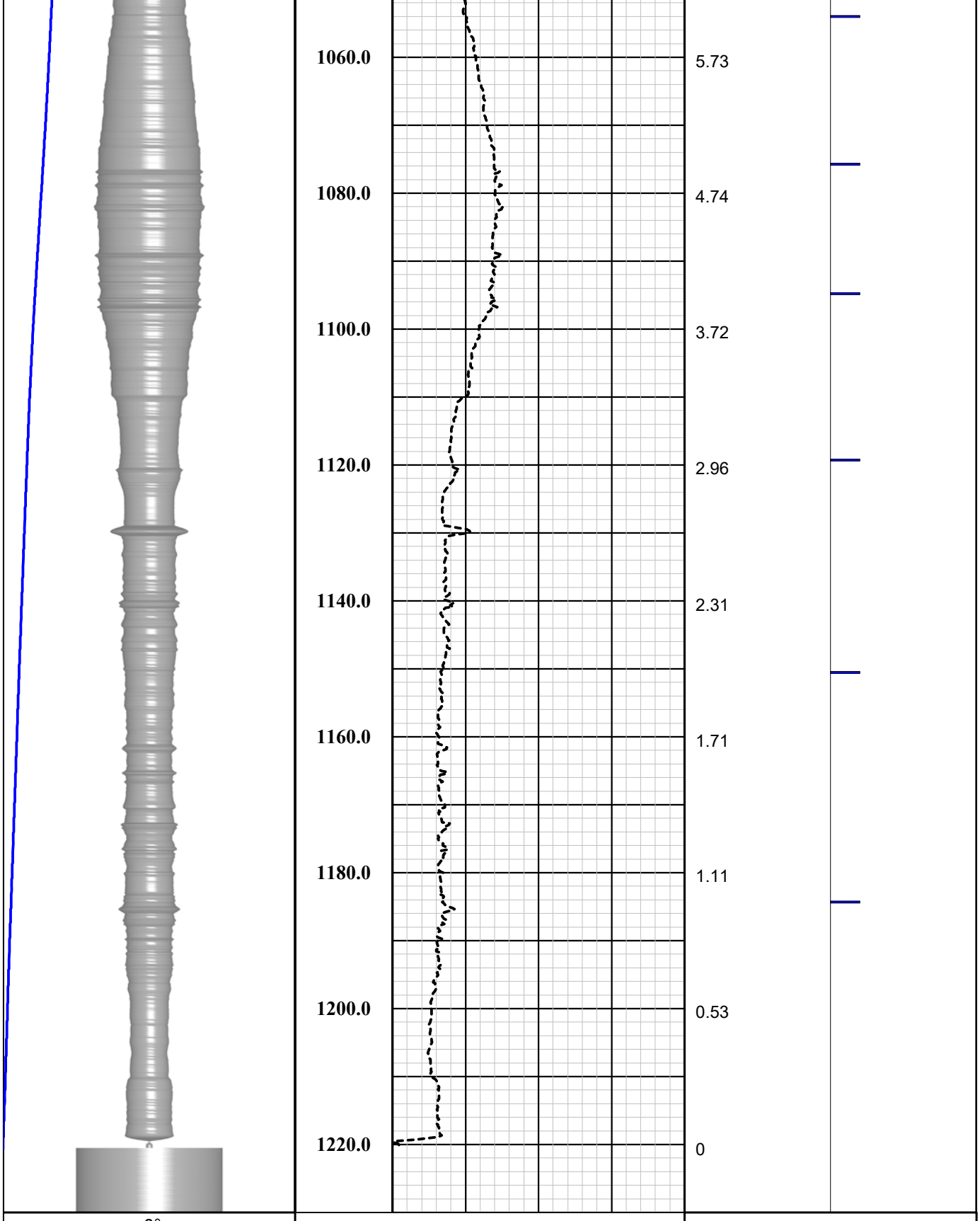
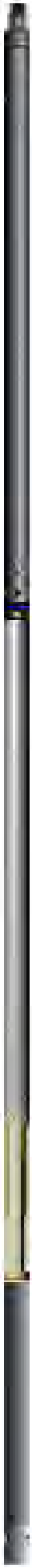


-0°			Based on 5.5" OD Casing
3-D View			
0 cu.yd 36.51	1in:20ft	10 Inches 30	
Total Volume	Depth	3-Arm Caliper	Cumulated Volume (cu.yd)

MSI Gamma-Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft
Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

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Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

NOTE: Lengths on a particular tool may vary from those listed on this document due to probe sizes and styles utilized

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

	Company FLORENCE COPPER

Southwest Exploration Services, LLC

borehole geophysics & video services

Well	R-03
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Final Caliper w / Volume Calculation Summary

Drift Report

Wellbore DRIFT Interpretation

PREPARED ESPECIALLY FOR

FLORENCE COPPER

R-03

Friday - November 10, 2017

Southwest Exploration Services, LLC
borehole geophysics and video services

Southwest Exploration Services, LLC
(480) 926-4558

WELLBORE DRIFT INTERPRETATION

Southwest Exploration Services, LLC

(480) 926-4558

Company: FLORENCE COPPER **Well Owner:**

County: PINAL **State:** Arizona **Country:** USA

Well Number: R-03 **Survey Date:** Friday - November 10, 2017 **Magnetic Declination:** Declination Correction Not Used

Field: **Drift Calculation Methodology:** Balanced Tangential Method

Location:

Remarks:

Witness: SCOTT - H&A **Vehicle No.:** 200 **Invoice No.:** **Operator:** M. QUINONES **Well Depth:** 503 Feet **Casing size:** 20 Inches

Tool: Compass - 6002 **Lat.:** **Long.:** **Sec.:** **Twp.:** **Rge.:**

MEASURED DATA			DATA COMPUTATIONS						
DEPTHS, feet	INCLINATIONS, degrees	AZIMUTHS, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEG SEV., degrees per 20 Feet	DOGLEG SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BGR., degrees
60	0.22	312.48	60.00						
80	0.27	002.31	79.99	0.073	-0.026	0.84	2.06	0.08' (.96")	340.10
100	0.35	010.82	99.99	0.180	-0.013	0.41	0.36	0.18' (2.16")	356.00
120	0.63	005.65	119.98	0.349	0.009	0.15	0.22	0.35' (4.20")	001.50
140	0.21	344.07	139.97	0.494	0.010	0.41	0.92	0.49' (5.88")	001.10
160	0.16	343.60	159.96	0.556	-0.008	0.84	0.02	0.56' (6.72")	359.20
180	0.47	359.81	179.95	0.665	-0.016	0.96	0.69	0.67' (8.04")	358.60
200	0.07	037.81	199.94	0.757	-0.009	0.40	1.60	0.76' (9.12")	359.30
220	0.09	255.76	219.93	0.763	-0.017	1.00	4.63	0.76' (9.12")	358.70
240	0.15	251.45	239.92	0.751	-0.057	1.00	0.18	0.75' (9.00")	355.70
260	0.11	224.08	259.91	0.729	-0.095	0.38	1.16	0.74' (8.88")	352.60
280	0.11	195.65	279.90	0.697	-0.114	0.94	1.20	0.71' (8.52")	350.70
300	0.38	293.89	299.89	0.705	-0.180	0.80	3.70	0.73' (8.76")	345.70
320	0.40	310.50	319.88	0.777	-0.294	0.49	0.71	0.83' (9.96")	339.30
340	0.14	276.81	339.87	0.825	-0.371	0.05	1.42	0.90' (10.80")	335.80
360	0.03	224.88	359.86	0.824	-0.399	0.52	2.14	0.92' (11.04")	334.20
380	0.14	274.32	379.85	0.822	-0.427	0.76	2.05	0.93' (11.16")	332.60
400	0.36	276.64	399.84	0.831	-0.514	0.91	0.10	0.98' (11.76")	328.30

True Vertical Depth: 500.78' **Final Drift Distance:** 1.23' (14.76") **Final Drift Bearing:** 313.50°

Note: Magnetic Declination is not used because it is not a factor in the calculation of well drift or alignment. Magnetic Declination is only important if attempting to hit a target or miss another well and then it is included in the calculations.

WELLBORE DRIFT INTERPRETATION

Southwest Exploration Services, LLC

R-03

(480) 926-4558

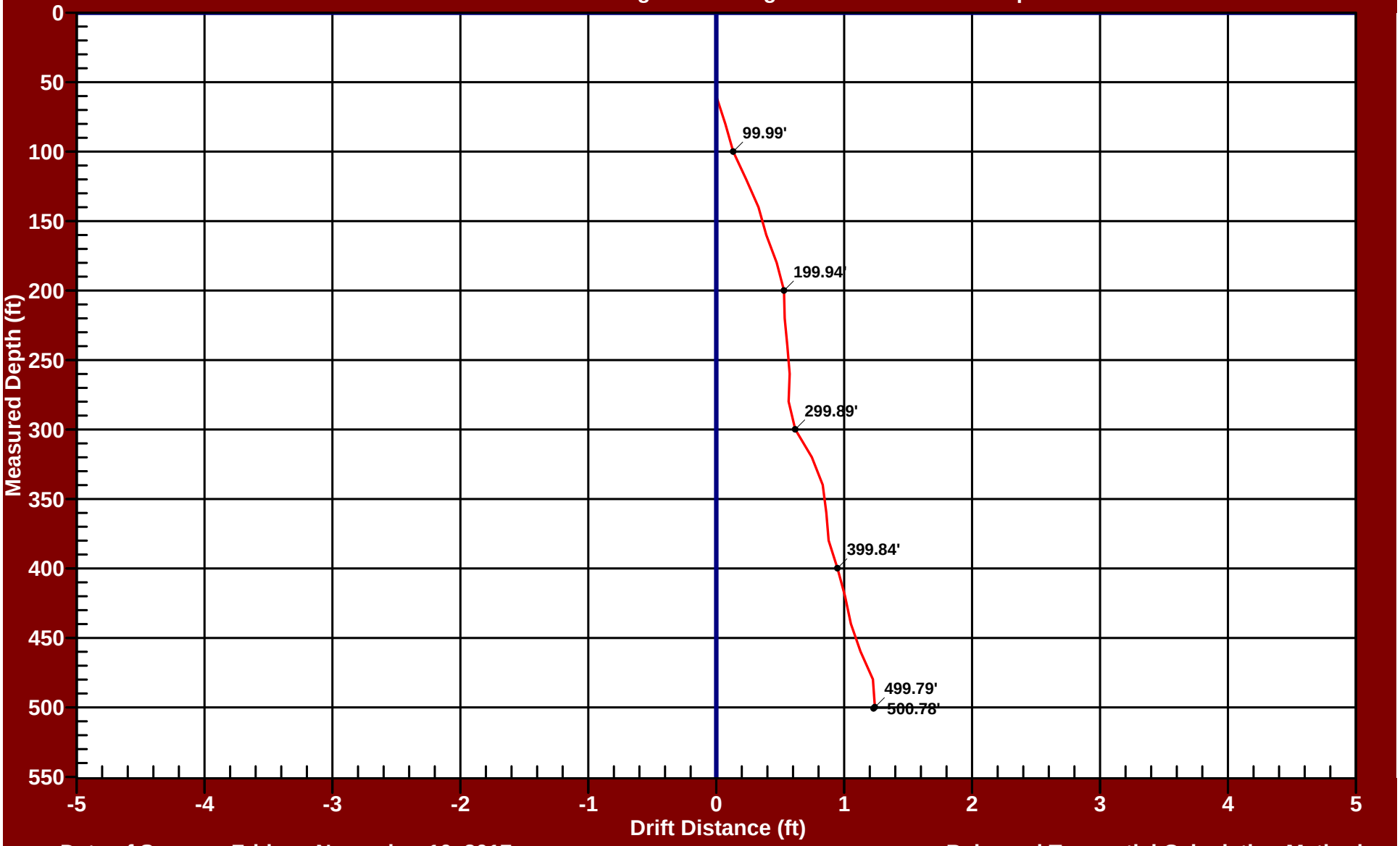
MEASURED DATA			DATA COMPUTATIONS						
DEPTHS, feet	INCLINATIONS, degrees	AZIMUTHS, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEG SEV., degrees per 20 Feet	DOGLEG SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BRG., degrees
420	0.06°	359.73°	419.83	0.849	-0.576	0.26	3.25	1.03' (12.36")	325.80
440	0.32°	269.37°	439.82	0.859	-0.632	0.98	3.47	1.07' (12.84")	323.70
460	0.23°	341.66°	459.81	0.896	-0.700	0.98	2.89	1.14' (13.68")	322.00
480	0.59°	265.65°	479.80	0.926	-0.815	0.19	3.02	1.23' (14.76")	318.60
500	0.40°	160.72°	499.79	0.852	-0.895	0.85	3.88	1.24' (14.88")	313.60
501	0.60°	133.32°	500.78	0.845	-0.890	0.91	23.21	1.23' (14.76")	313.50

True Vertical Depth: 500.78' **Final Drift Distance: 1.23' (14.76")** **Final Drift Bearing: 313.50°**

PLANE OF DRIFT VIEW - R-03

FLORENCE COPPER

Drift Distance = 1.23 Feet Drift Bearing = 313.5 Degrees True Vertical Depth = 500.78 Feet



Date of Survey: Friday - November 10, 2017

Balanced Tangential Calculation Method

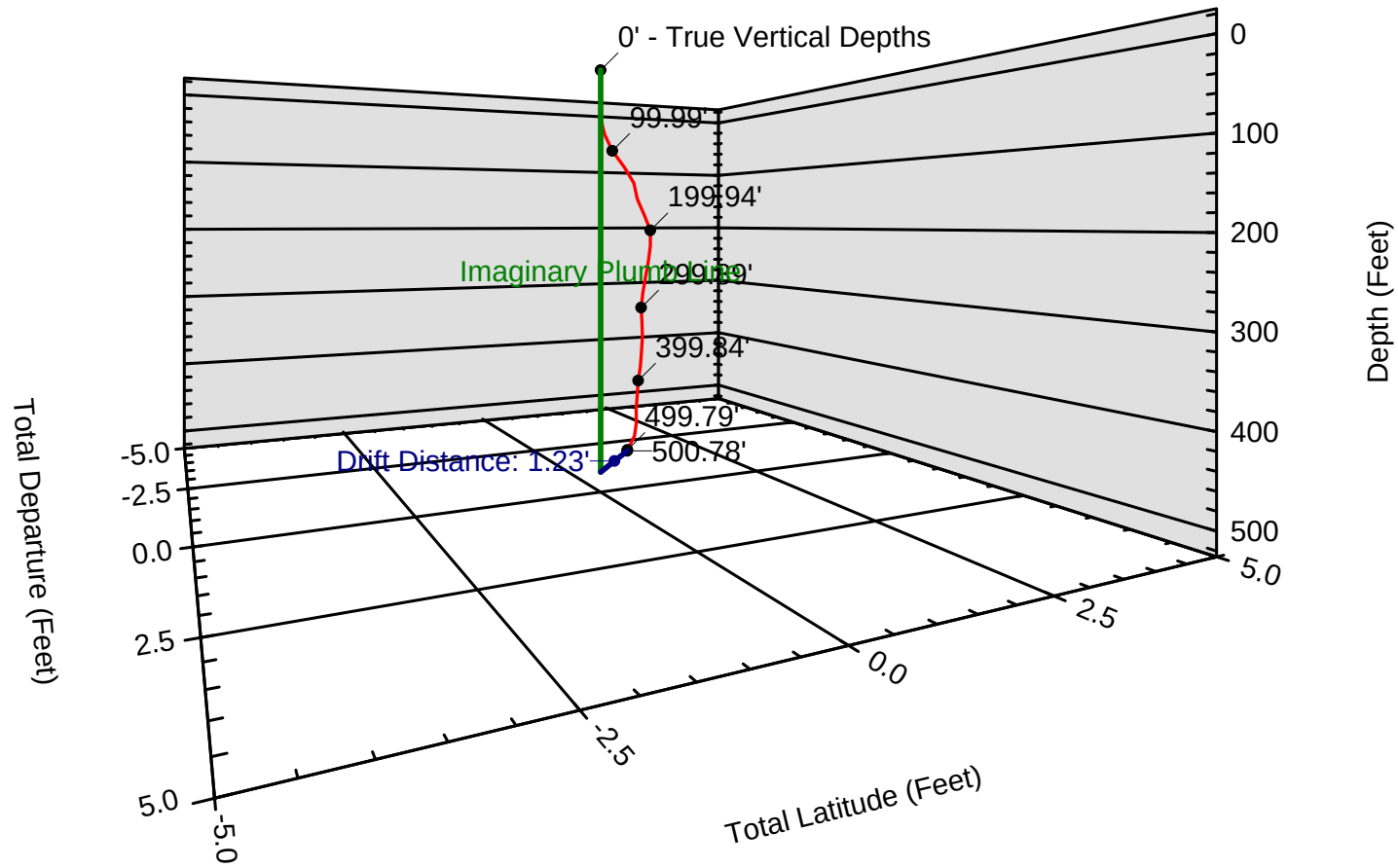
Southwest Exploration Services, LLC (480) 926-4558

3D PROJECTION VIEW - R-03

FLORENCE COPPER

Drift Distance = 1.23 Feet **Drift Bearing = 313.5 Degrees** **True Vertical Depth = 500.78 Feet**

245.0



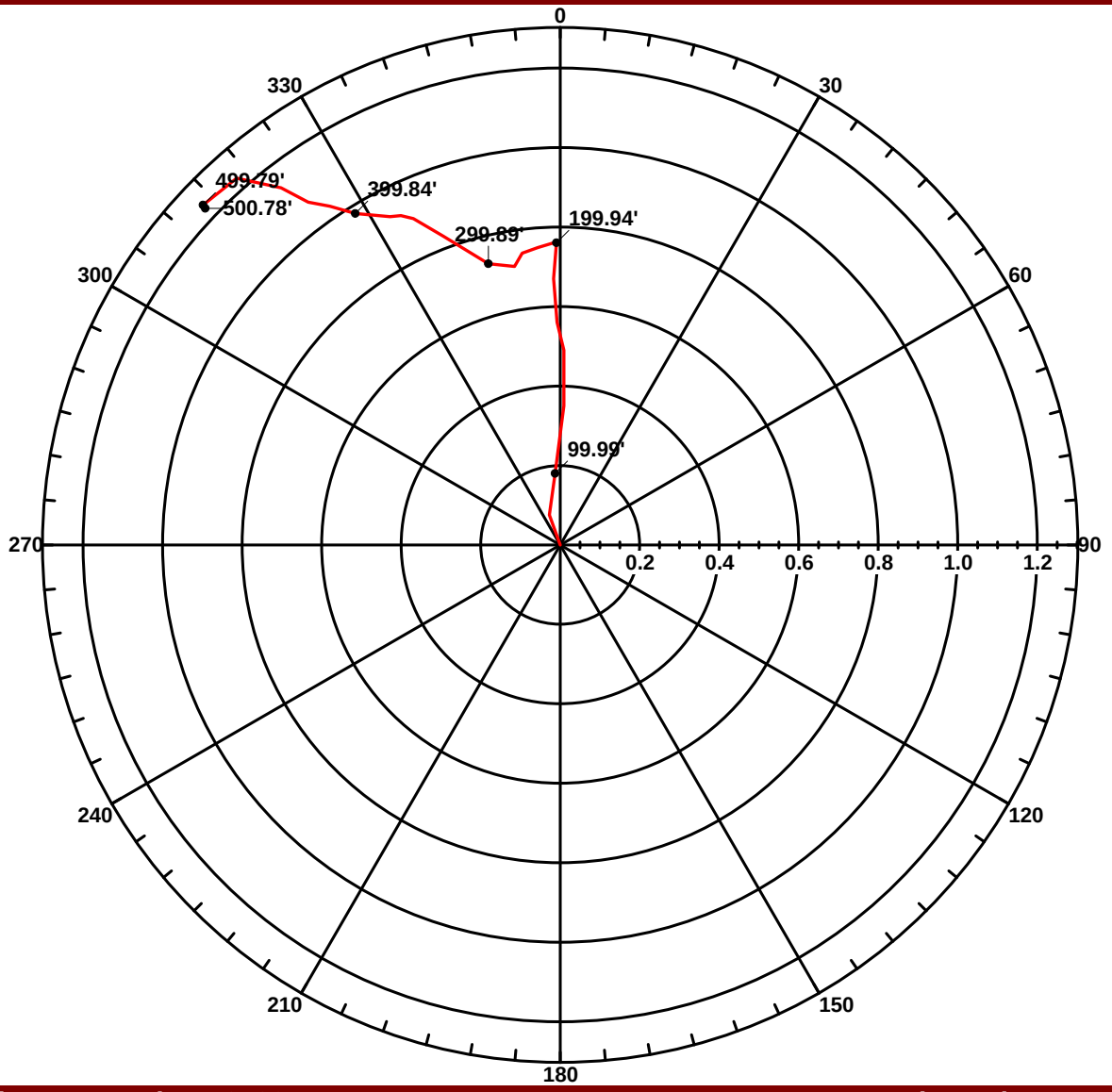
Date of Survey: Friday - November 10, 2017 **Balanced Tangential Calculation Method**

Southwest Exploration Services, LLC (480) 926-4558

POLAR VIEW - R-03

FLORENCE COPPER

Drift Distance = 1.23 Feet Drift Bearing = 313.5 Degrees True Vertical Depth = 500.78 Feet



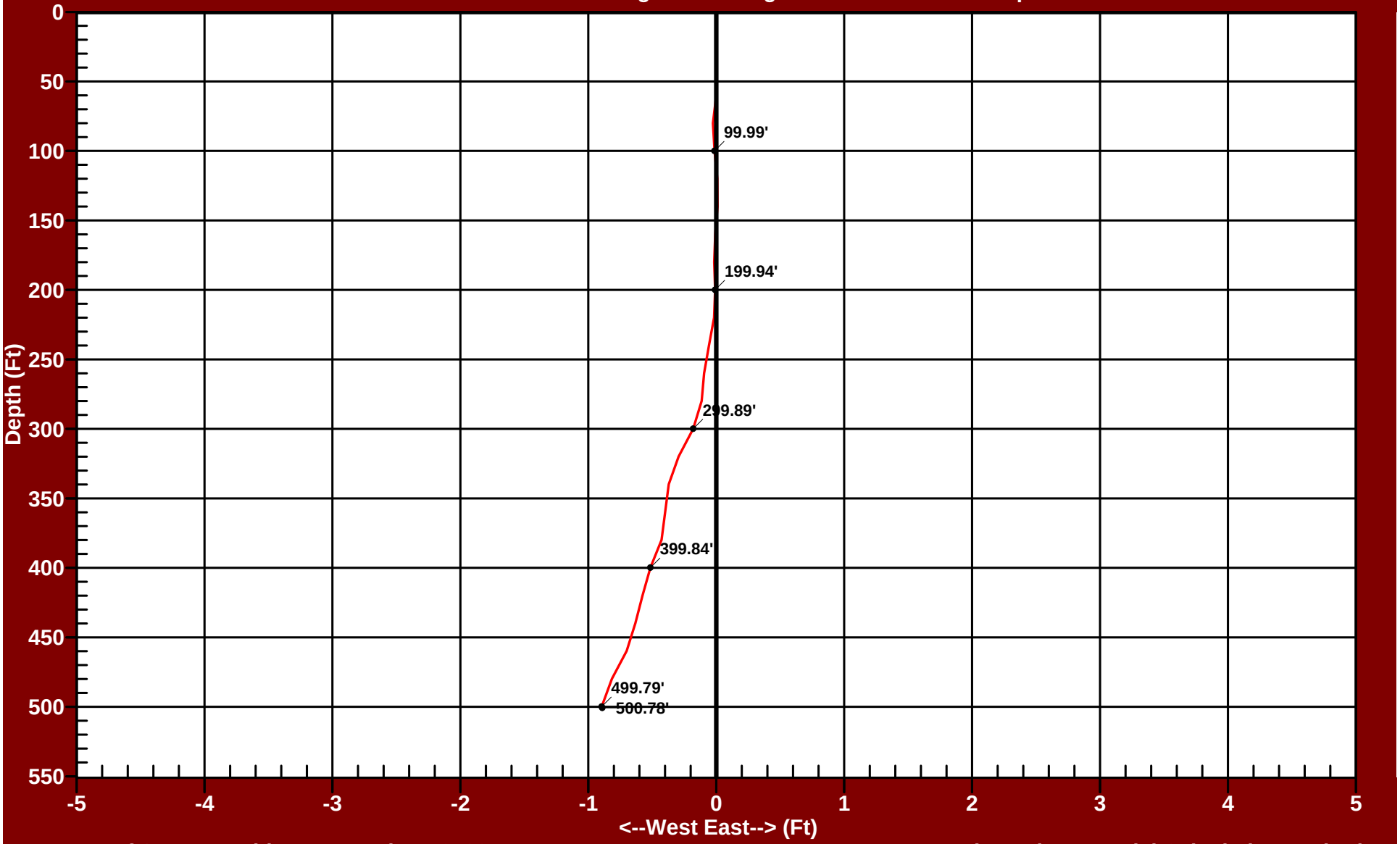
Date of Survey: Friday - November 10, 2017 **Balanced Tangential Calculation Method**

Southwest Exploration Services, LLC (480) 926-4558

EASTING RECTANGULAR VIEW - R-03

FLORENCE COPPER

Drift Distance = 1.23 Feet Drift Bearing = 313.5 Degrees True Vertical Depth = 500.78 Feet



Date of Survey: Friday - November 10, 2017

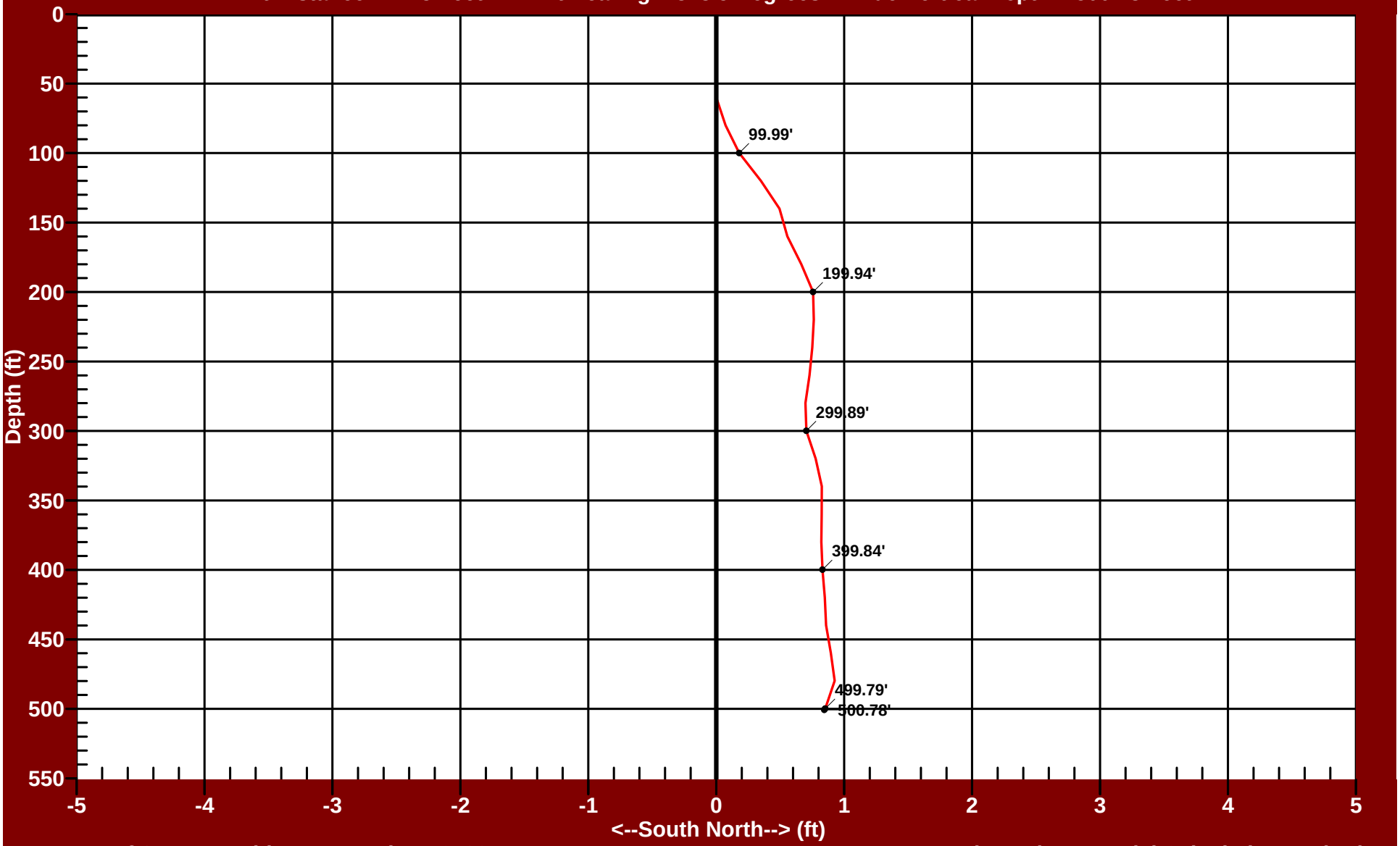
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

NORTHING RECTANGULAR VIEW - R-03

FLORENCE COPPER

Drift Distance = 1.23 Feet Drift Bearing = 313.5 Degrees True Vertical Depth = 500.78 Feet



Date of Survey: Friday - November 10, 2017

Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

Drift Report

Wellbore DRIFT Interpretation

PREPARED ESPECIALLY FOR

FLORENCE COPPER

R-03

Friday - December 8, 2017

Southwest Exploration Services, LLC
(480) 926-4558

WELLBORE DRIFT INTERPRETATION

Southwest Exploration Services, LLC

(480) 926-4558

Company: FLORENCE COPPER **Well Owner:**

County: PINAL **State:** Arizona **Country:** USA

Well Number: R-03 **Survey Date:** Friday - December 8, 2017 **Magnetic Declination:** Declination Correction Not Used

Field: FLORENCE COPPER **Drift Calculation Methodology:** Balanced Tangential Method

Location:

Remarks:

Witness: SCOTT - H&A **Vehicle No.:** 200 **Invoice No.:** **Operator:** A. OLSON **Well Depth:** 1220 Feet **Casing size:** 12.25 Inches

Tool: Compass - 3082 **Lat.:** **Long.:** **Sec.:** **Twp.:** **Rge.:**

MEASURED DATA			DATA COMPUTATIONS						
DEPTHS, feet	INCLINATIONS, degrees	AZIMUTHS, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEG SEV., degrees per 20 Feet	DOGLEG SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BGR., degrees
500	0.06	147.40	500.00						
520	0.15	329.30	519.99	0.014	-0.008	0.95	2.61	0.02' (.24")	330.60
540	0.10	308.12	539.98	0.047	-0.035	0.18	0.48	0.06' (.72")	323.40
560	0.06	055.81	559.97	0.064	-0.040	0.37	2.11	0.08' (.96")	327.80
580	0.21	296.80	579.96	0.086	-0.064	0.20	2.25	0.11' (1.32")	323.50
600	0.04	351.62	599.95	0.109	-0.098	0.94	1.20	0.15' (1.80")	318.20
620	0.12	168.80	619.94	0.095	-0.095	1.00	2.61	0.13' (1.56")	315.10
640	0.03	180.25	639.93	0.069	-0.091	0.58	0.26	0.11' (1.32")	307.30
660	0.02	024.54	659.92	0.067	-0.090	0.98	2.55	0.11' (1.32")	306.80
680	0.07	156.52	679.91	0.059	-0.084	0.99	2.38	0.10' (1.20")	305.20
700	0.11	143.17	699.90	0.032	-0.068	0.55	0.30	0.07' (.84")	295.60
720	0.20	113.84	719.89	0.003	-0.025	0.99	0.66	0.02' (.24")	275.90
740	0.26	099.58	739.88	-0.019	0.052	0.90	0.32	0.05' (.60")	109.90
760	0.27	099.26	759.87	-0.034	0.143	0.33	0.01	0.15' (1.80")	103.40
780	0.33	102.42	779.86	-0.054	0.246	0.22	0.07	0.25' (3.00")	102.40
800	0.26	079.17	799.85	-0.058	0.347	0.36	0.53	0.35' (4.20")	099.50
820	0.16	092.21	819.84	-0.051	0.419	0.86	0.30	0.42' (5.04")	096.90
840	0.44	100.39	839.83	-0.066	0.522	0.96	0.19	0.53' (6.36")	097.20

True Vertical Depth: 1219.65' **Final Drift Distance:** 3.51' (42.12") **Final Drift Bearing:** 110.20°

Note: Magnetic Declination is not used because it is not a factor in the calculation of well drift or alignment. Magnetic Declination is only important if attempting to hit a target or miss another well and then it is included in the calculations.

WELLBORE DRIFT INTERPRETATION

Southwest Exploration Services, LLC

R-03

(480) 926-4558

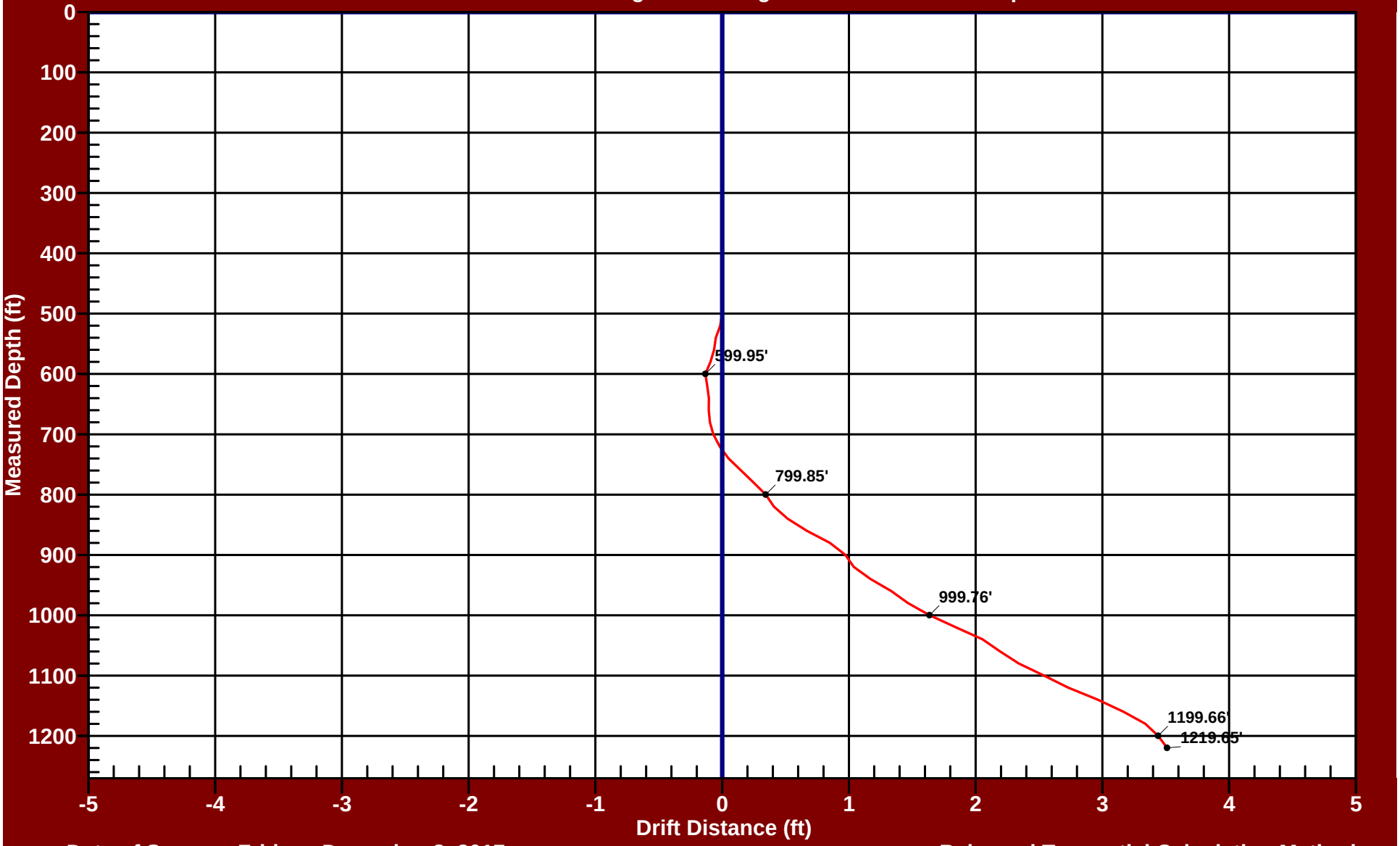
MEASURED DATA			DATA COMPUTATIONS						
DEPTHS, feet	INCLINATIONS, degrees	AZIMUTHS, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEG SEV., degrees per 20 Feet	DOGLEG SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BRG., degrees
860	0.45°	109.38°	859.82	-0.106	0.672	0.40	0.20	0.68' (8.16")	099.00
880	0.58°	110.65°	879.81	-0.168	0.841	1.00	0.03	0.86' (10.32")	101.30
900	0.14°	126.62°	899.80	-0.218	0.955	1.00	0.36	0.98' (11.76")	102.90
920	0.30°	069.02°	919.79	-0.214	1.023	0.32	1.26	1.05' (12.60")	101.80
940	0.58°	092.62°	939.78	-0.200	1.173	0.92	0.53	1.19' (14.28")	099.70
960	0.38°	098.55°	959.77	-0.214	1.340	0.74	0.13	1.36' (16.32")	099.10
980	0.44°	082.72°	979.76	-0.214	1.482	0.58	0.36	1.50' (18.00")	098.20
1,000	0.61°	116.48°	999.76	-0.252	1.653	0.06	0.76	1.67' (20.04")	098.70
1,020	0.59°	112.19°	1,019.75	-0.338	1.844	0.60	0.10	1.87' (22.44")	100.40
1,040	0.57°	103.31°	1,039.74	-0.400	2.036	0.68	0.20	2.08' (24.96")	101.10
1,060	0.44°	162.63°	1,059.73	-0.496	2.156	0.84	1.29	2.21' (26.52")	103.00
1,080	0.55°	105.10°	1,079.72	-0.594	2.272	0.11	1.25	2.35' (28.20")	104.70
1,100	0.59°	104.95°	1,099.71	-0.646	2.464	0.94	0.00	2.55' (30.60")	104.70
1,120	0.54°	114.12°	1,119.70	-0.711	2.650	0.92	0.21	2.74' (32.88")	105.00
1,140	0.76°	120.54°	1,139.69	-0.817	2.850	0.01	0.15	2.97' (35.64")	106.00
1,160	0.48°	125.89°	1,159.68	-0.934	3.032	0.72	0.12	3.17' (38.04")	107.10
1,180	0.53°	131.98°	1,179.67	-1.045	3.169	0.46	0.14	3.34' (40.08")	108.30
1,200	0.20°	170.36°	1,199.66	-1.141	3.244	0.84	0.86	3.44' (41.28")	109.40
1,220	0.34°	127.89°	1,219.65	-1.212	3.297	0.45	0.94	3.51' (42.12")	110.20

Page No. 2 **True Vertical Depth: 1219.65'** **Final Drift Distance: 3.51' (42.12")** **Final Drift Bearing: 110.20°**

PLANE OF DRIFT VIEW - R-03

FLORENCE COPPER

Drift Distance = 3.51 Feet Drift Bearing = 110.2 Degrees True Vertical Depth = 1219.65 Feet



Date of Survey: Friday - December 8, 2017

Balanced Tangential Calculation Method

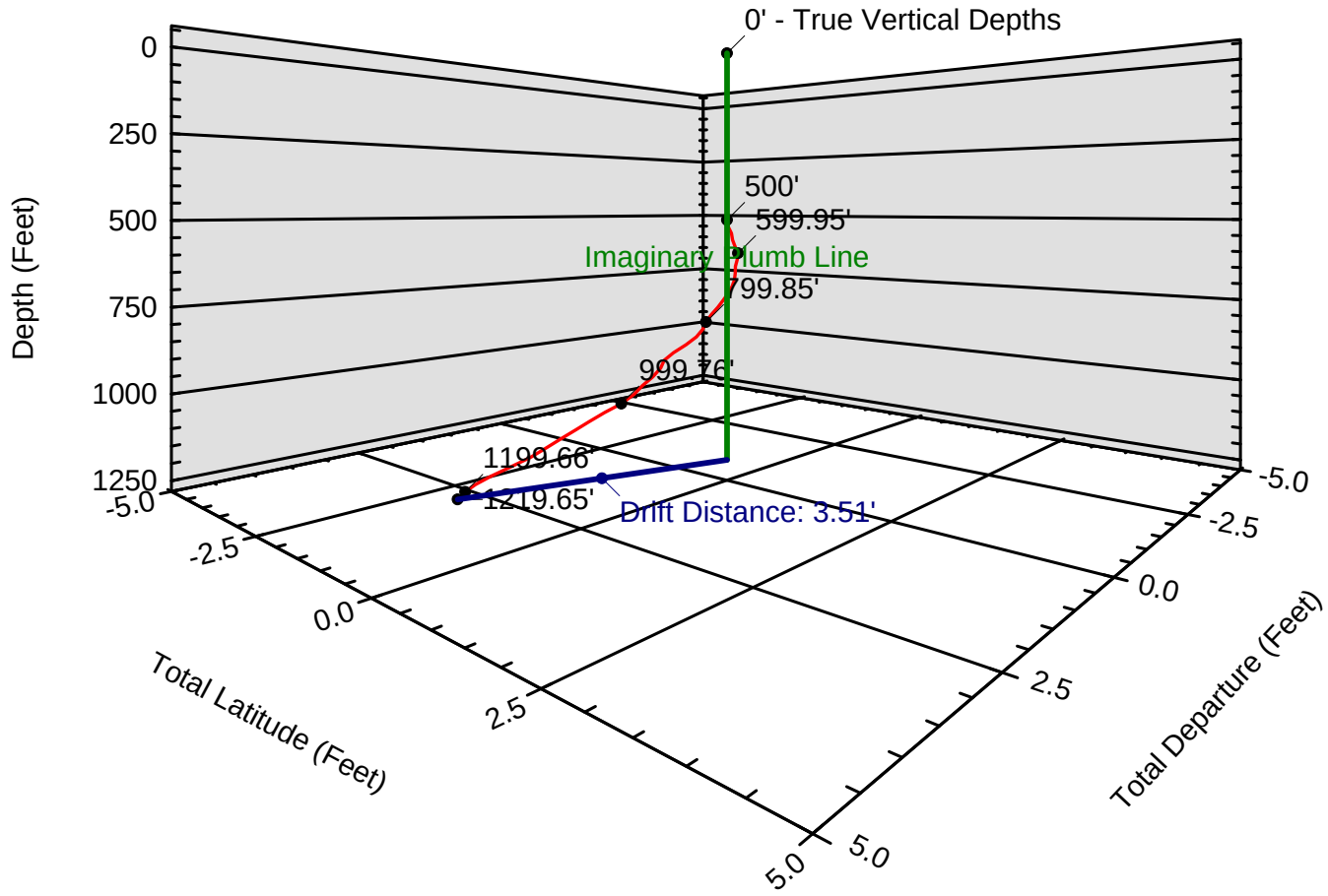
Southwest Exploration Services, LLC (480) 926-4558

3D PROJECTION VIEW - R-03

FLORENCE COPPER

Drift Distance = 3.51 Feet Drift Bearing = 110.2 Degrees True Vertical Depth = 1219.65 Feet

311.0



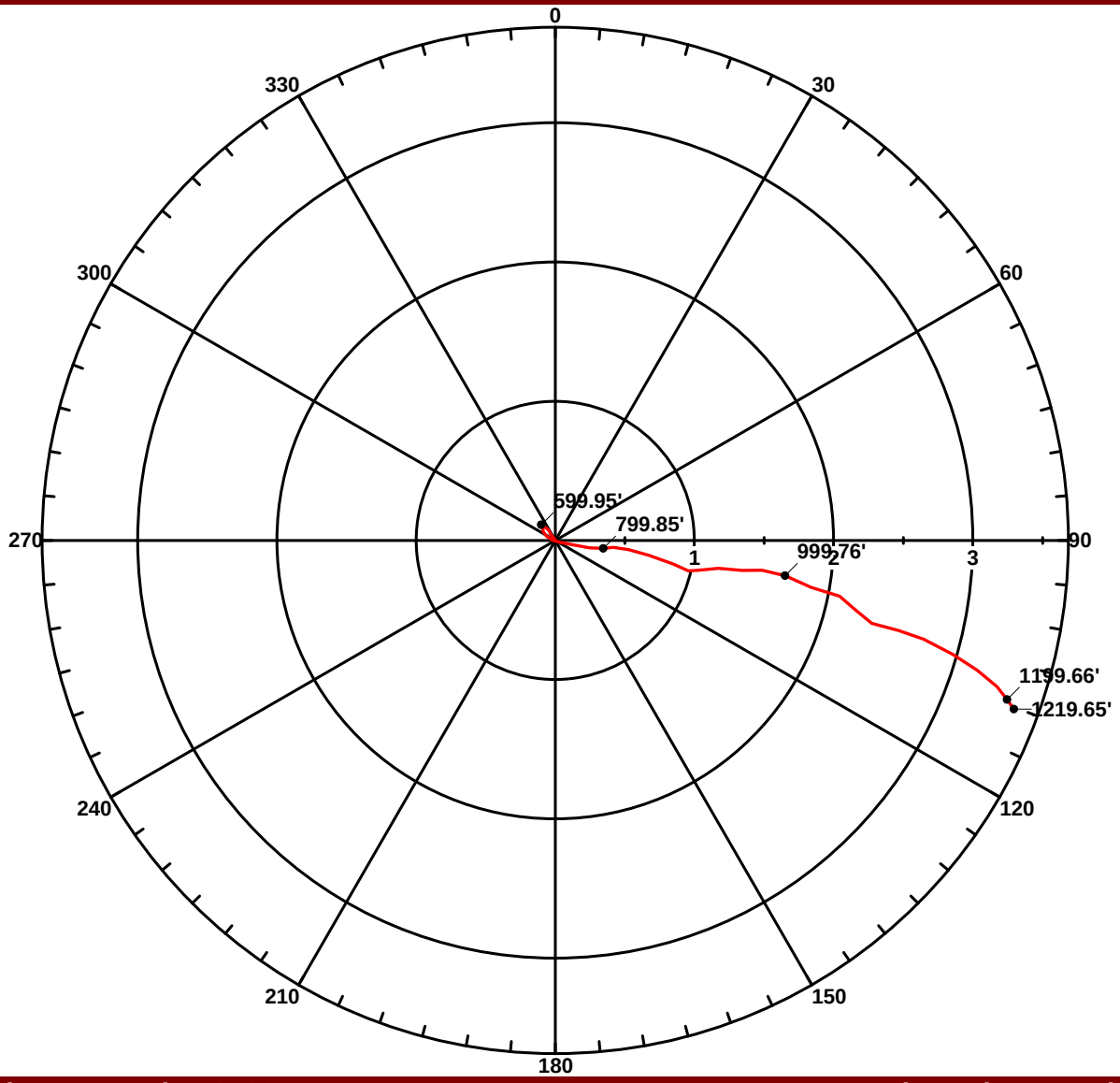
Date of Survey: Friday - December 8, 2017 **Balanced Tangential Calculation Method**

Southwest Exploration Services, LLC (480) 926-4558

POLAR VIEW - R-03

FLORENCE COPPER

Drift Distance = 3.51 Feet Drift Bearing = 110.2 Degrees True Vertical Depth = 1219.65 Feet



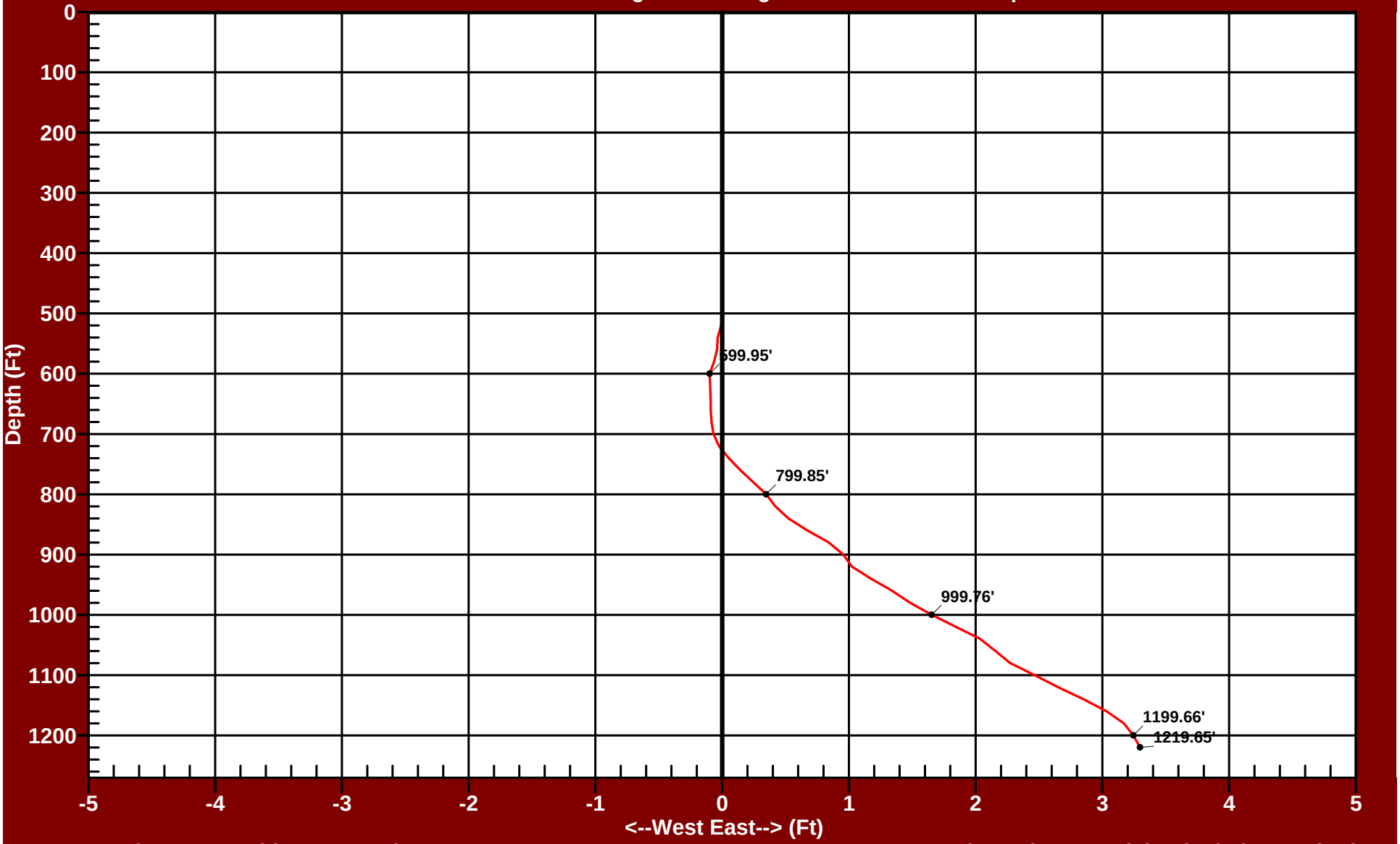
Date of Survey: Friday - December 8, 2017 **Balanced Tangential Calculation Method**

Southwest Exploration Services, LLC (480) 926-4558

EASTING RECTANGULAR VIEW - R-03

FLORENCE COPPER

Drift Distance = 3.51 Feet Drift Bearing = 110.2 Degrees True Vertical Depth = 1219.65 Feet



Date of Survey: Friday - December 8, 2017

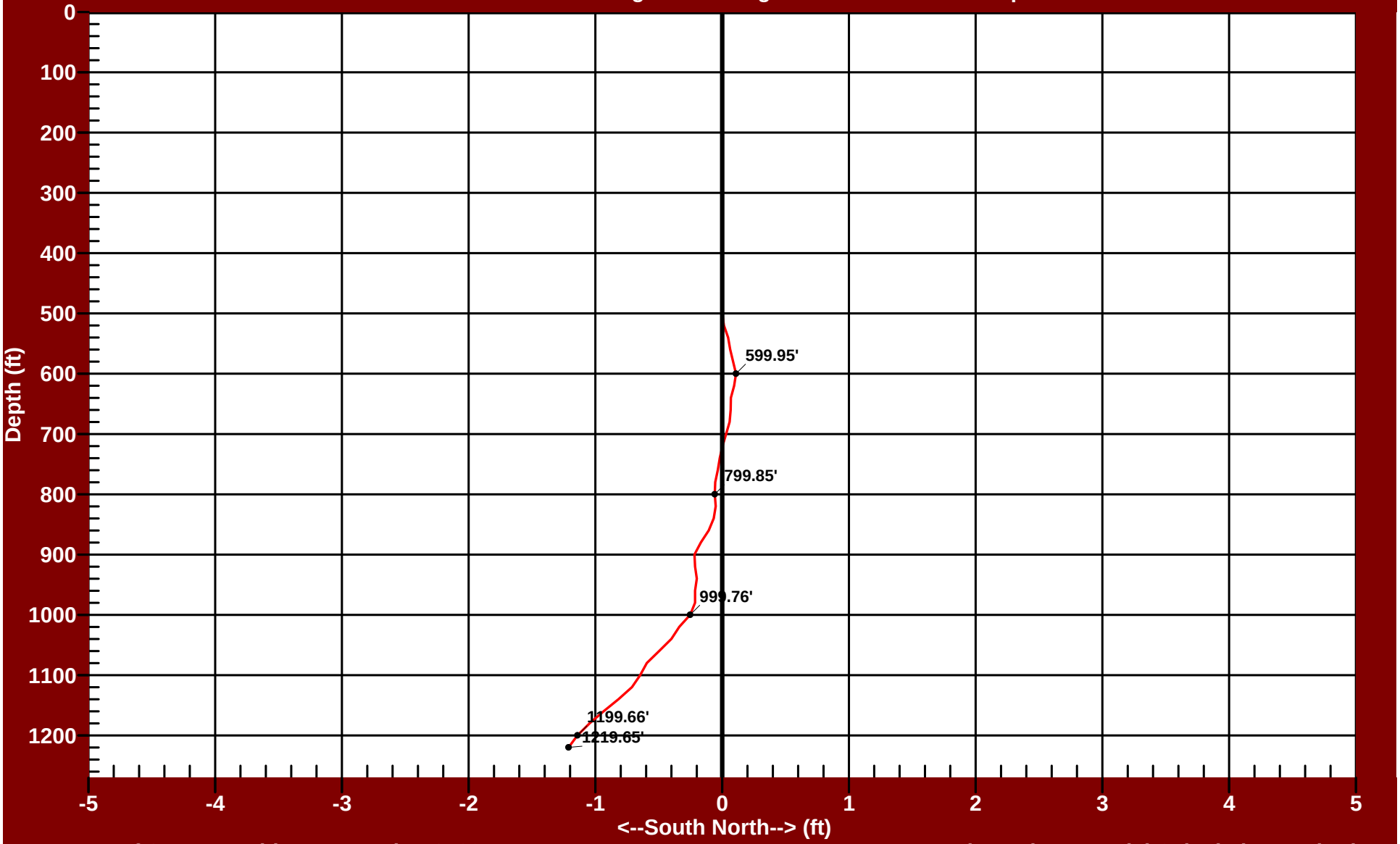
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

NORTHING RECTANGULAR VIEW - R-03

FLORENCE COPPER

Drift Distance = 3.51 Feet Drift Bearing = 110.2 Degrees True Vertical Depth = 1219.65 Feet



Date of Survey: Friday - December 8, 2017

Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	R-03		
FIELD	FLORENCE COPPER		
COUNTY	PINAL	STATE	ARIZONA

TYPE OF LOGS: GAMMA - CALIPER

MORE: TEMP. / FLUID COND.

LOCATION

SEC TWP RGE

OTHER SERVICES
SONIC
4 PI DENSITY
DUAL DENSITY

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	3-2-18	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	GAMMA - CALIPER - FTC	VISCOSITY	N/A
DEPTH-DRILLER	1200 FT.	LEVEL	~ 224 FT.
DEPTH-LOGGER	1185 FT.	MAX. REC. TEMP.	30.3 DEG. C
BTM LOGGED INTERVAL	1185 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #750
RECORDED BY / Logging Eng.	A. OLSON / E. TURNER	TOOL STRING/SN	QL COMBO TOOL SN 6161
WITNESSED BY	KENDRA - H&A	LOG TIME:ON SITE/OFF SITE	8:00 A.M.

RUN NO.	BOREHOLE RECORD BIT	FROM	TO	CASING RECORD SIZE	WGT.	FROM	TO
1	?	SURFACE	40 FT.	14 IN.	STEEL	SURFACE	500 FT.
2	20 IN.	40 FT.	500 FT.	5 IN.	FG	SURFACE	500 FT.
3	12 1/4 IN.	500 FT.	TOTAL DEPTH	5 IN.	PVC	500 FT.	TOTAL DEPTH

COMMENTS:

.

Tool Summary:

Date	3-2-18	**Date**	3-2-18	**Date**	3-2-18
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	QL COMBO TOOL	**Tool Model**	ALT 4 RX SONIC	**Tool Model**	COMPROBE 4 PI
Tool SN	6161	**Tool SN**	4572	**Tool SN**	6009
From	SURFACE	**From**	215 FT.	**From**	SURFACE
To	1185 FT.	**To**	1185 FT.	**To**	1185 FT.
Recorded By	E. TURNER	**Recorded By**	E. TURNER	**Recorded By**	E. TURNER
Truck No	750	**Truck No**	750	**Truck No**	750
Operation Check	2-28-18	**Operation Check**	2-28-18	**Operation Check**	2-28-18
Calibration Check	2-28-18	**Calibration Check**	N/A	**Calibration Check**	N/A
Time Logged	8:15 A.M.	**Time Logged**	9:10 A.M.	**Time Logged**	9:55 A.M.

Date	3-2-18	**Date**		**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model	ALT QL DENSITY	**Tool Model**		**Tool Model**	
Tool SN	6187	**Tool SN**		**Tool SN**	
From	SURFACE	**From**		**From**	
To	1185 FT.	**To**		**To**	
Recorded By	E. TURNER	**Recorded By**		**Recorded By**	
Truck No	750	**Truck No**		**Truck No**	
Operation Check	2-28-18	**Operation Check**		**Operation Check**	
Calibration Check	N/A	**Calibration Check**		**Calibration Check**	
Time Logged	10:25 A.M.	**Time Logged**		**Time Logged**	

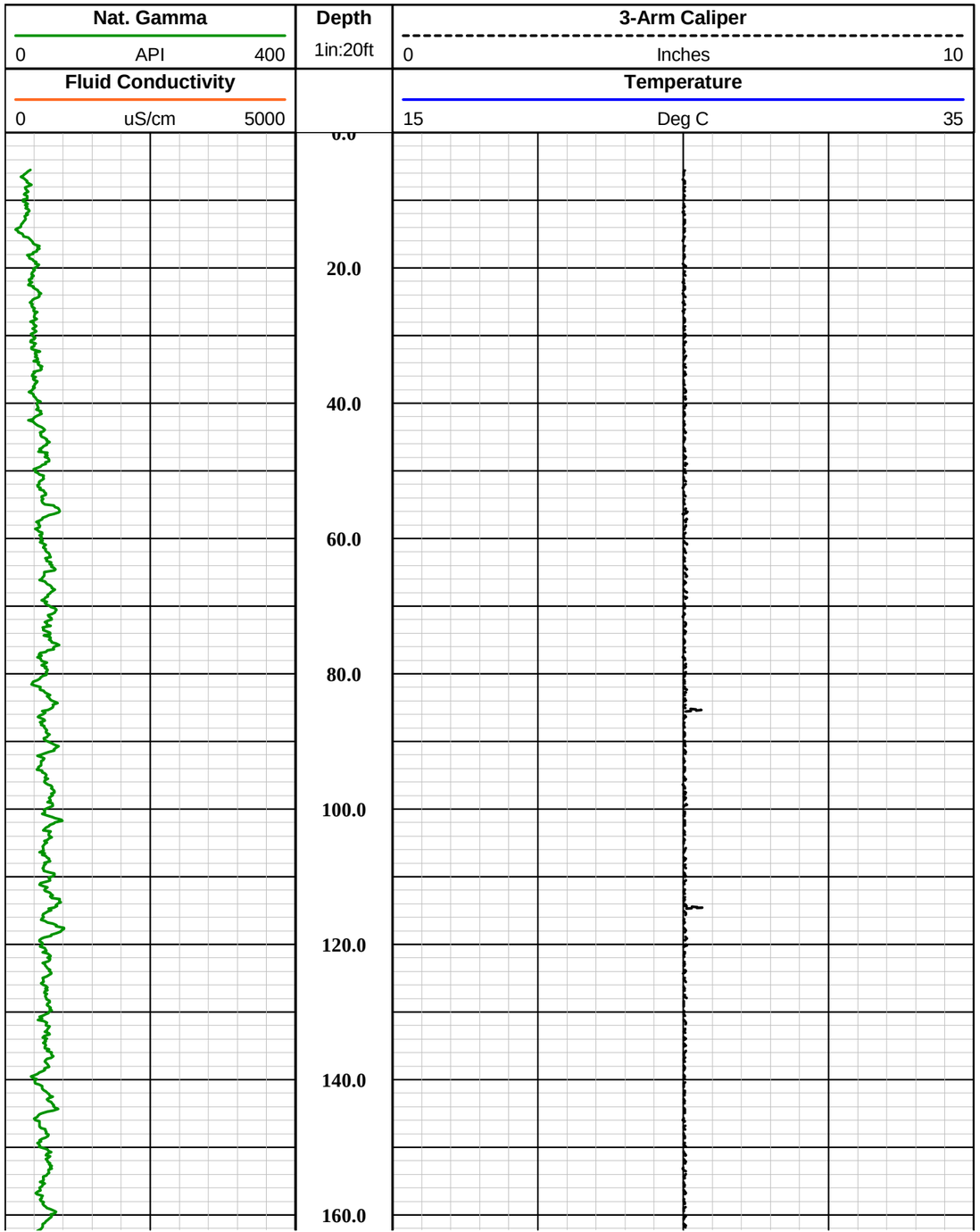
Additional Comments:

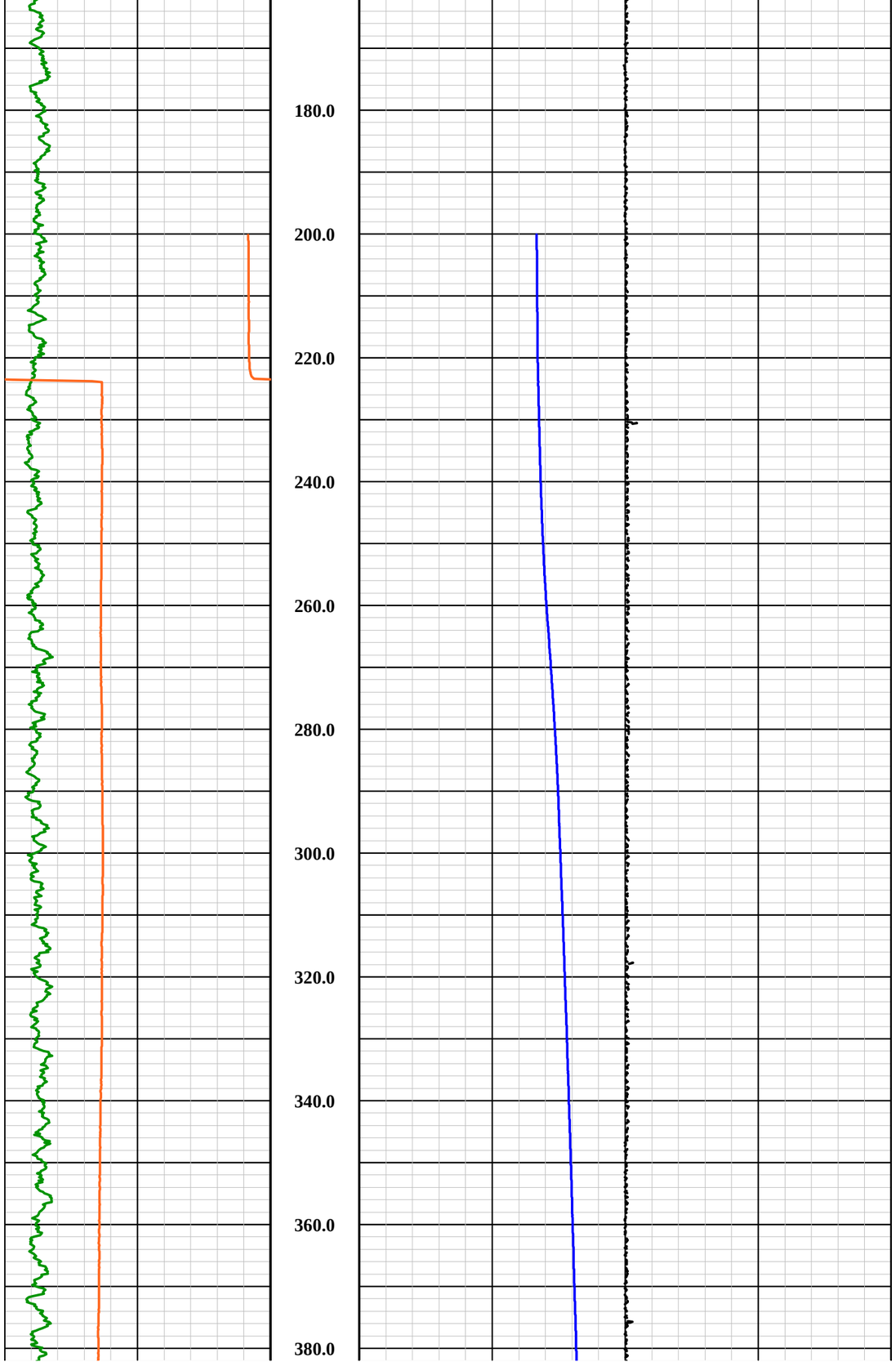
Caliper Arms Used: 9 IN. **Calibration Points:** 4 IN. & 12 IN.

E-Log Calibration Range: N/A **Calibration Points:** N/A

Disclaimer:

All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

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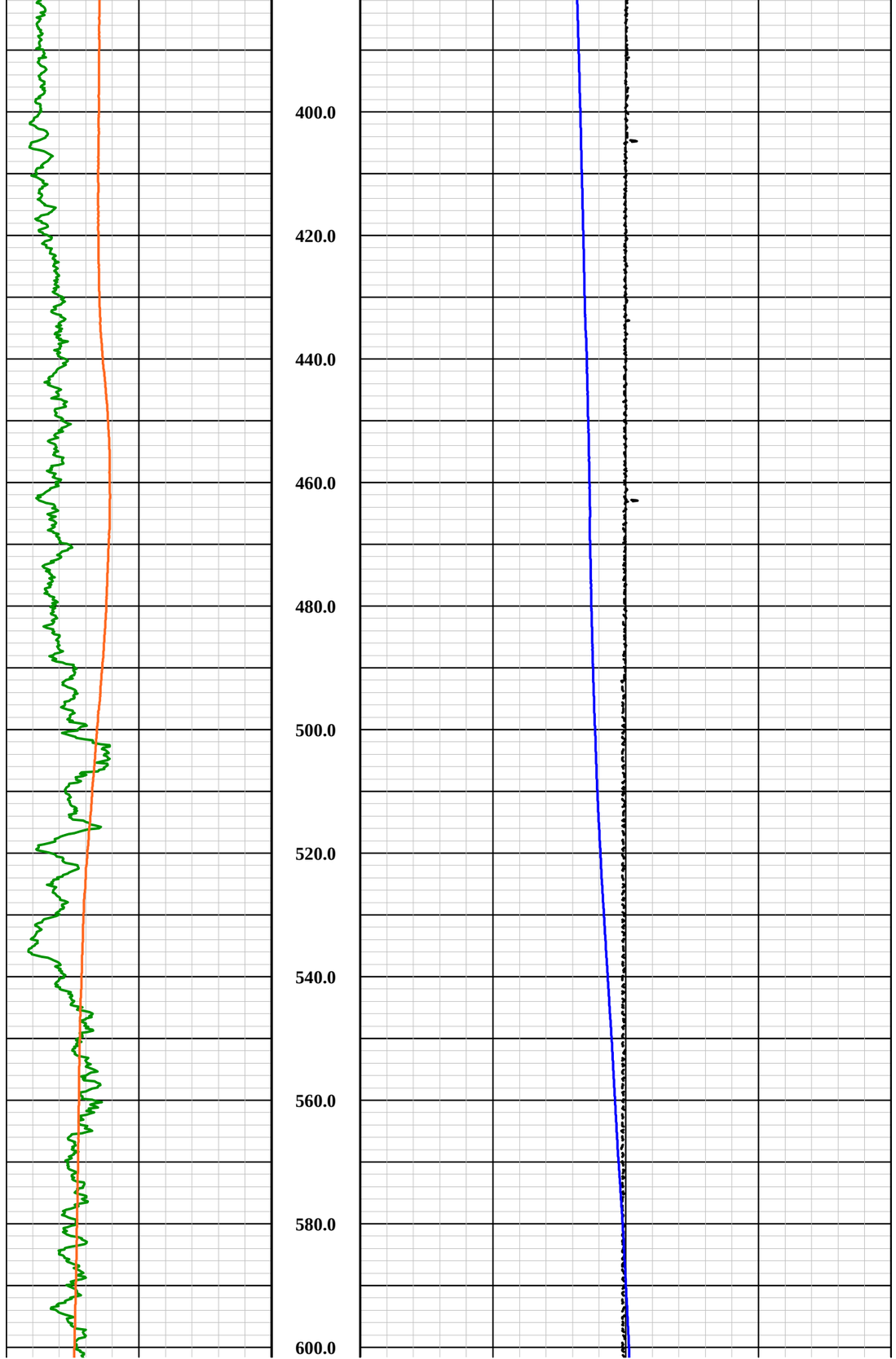
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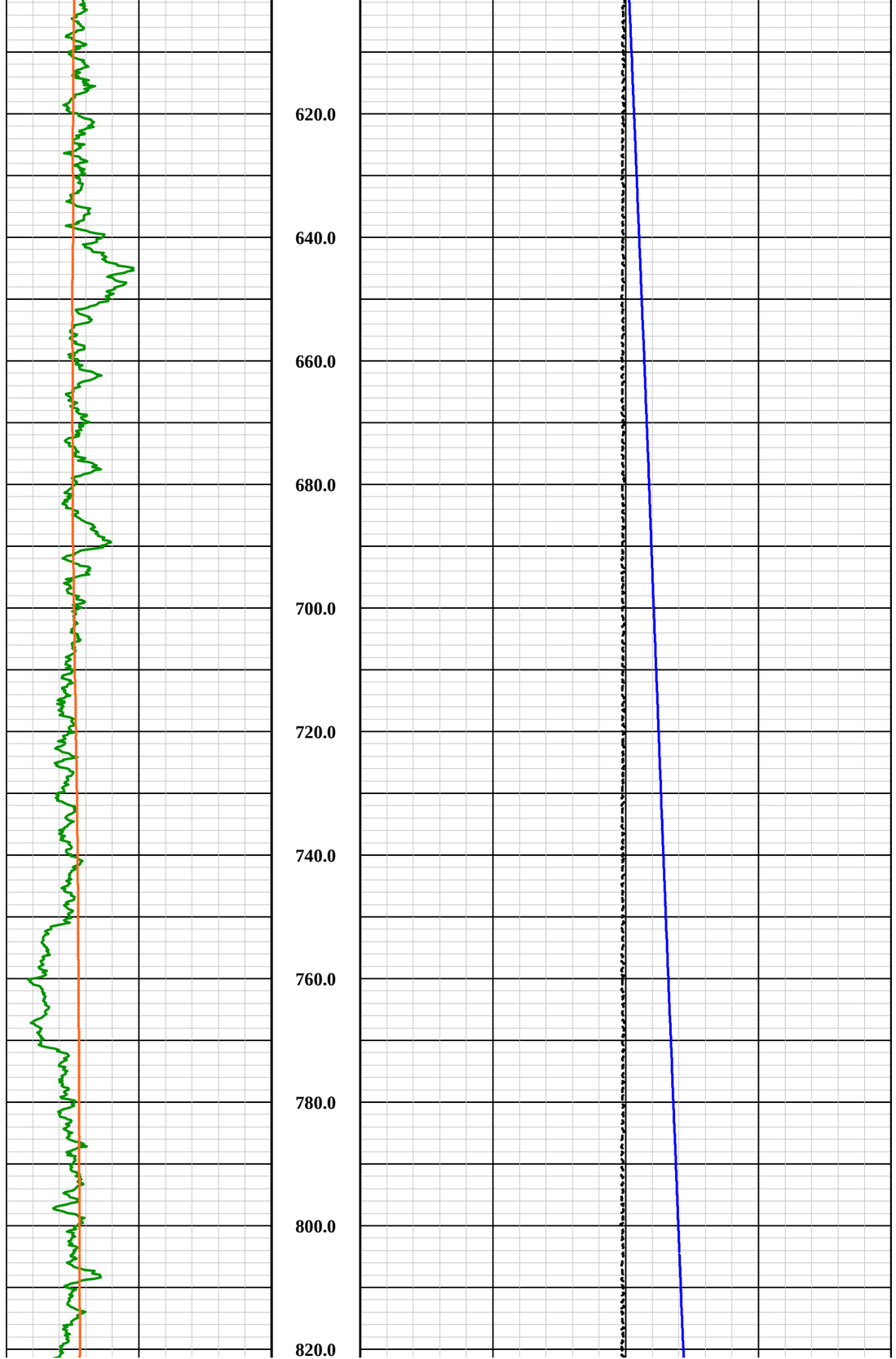
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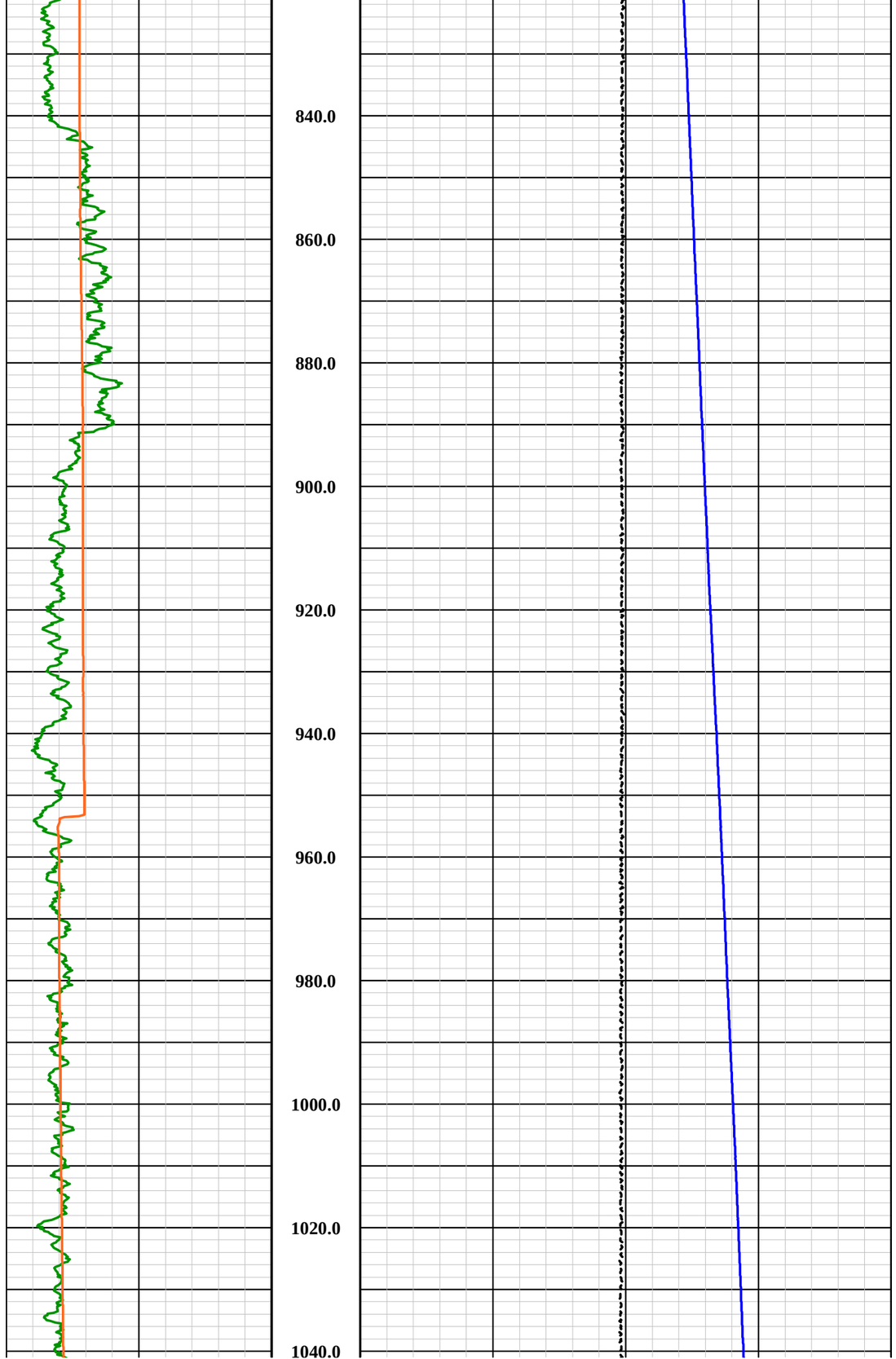
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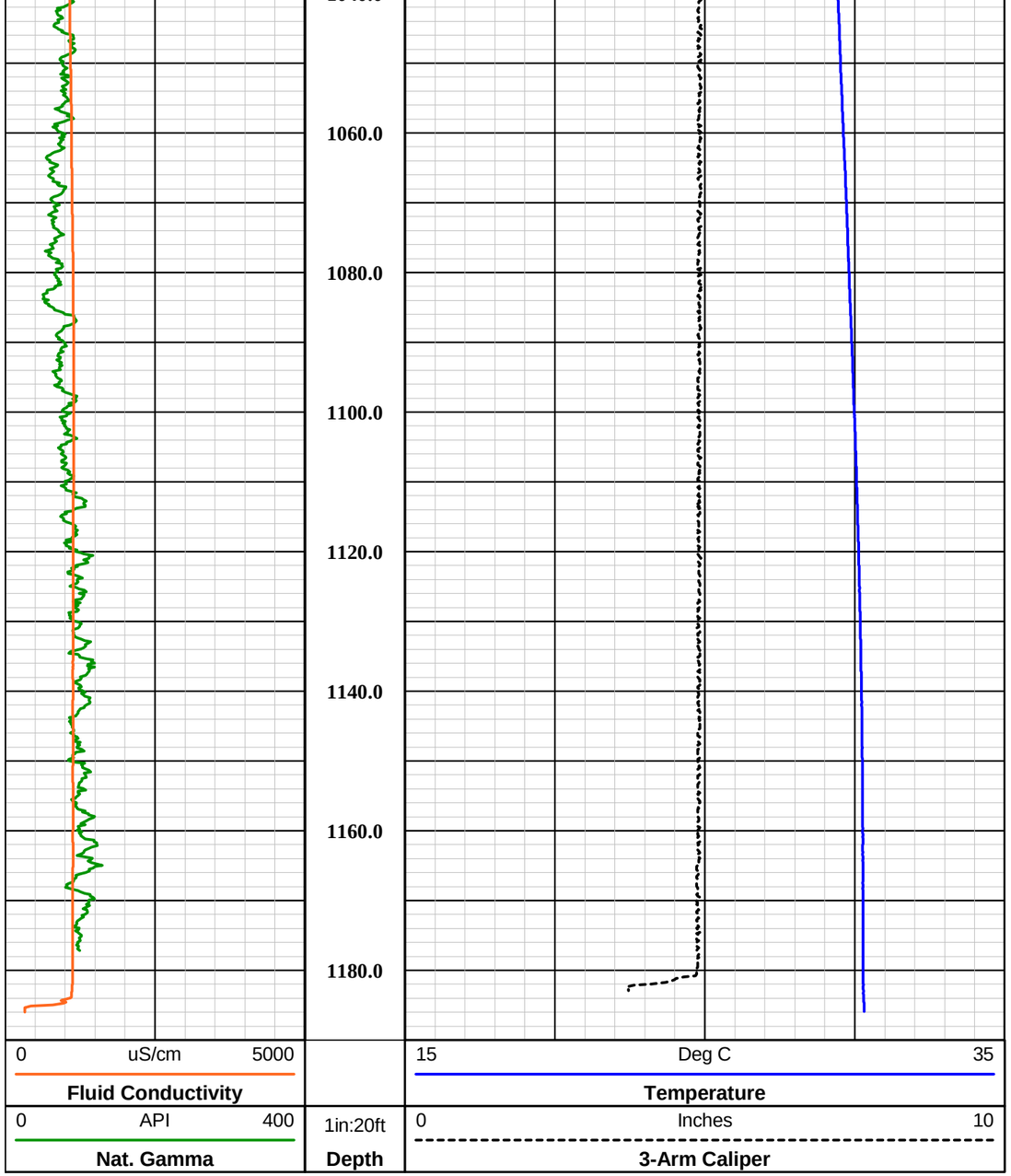
860.0
880.0
900.0
920.0
940.0
960.0
980.0
1000.0
1020.0
1040.0



QL40 Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161 & 6292

Four Conductor MSI Probe Top

Probe Length = 3.69 m or 12.12 ft
Probe Weight = 18.195 kg or 40.11 lbs

Caliper arms can only collect data logging up hole

Caliper arms can only collect data logging up hole

Fluid Temperature/Conductivity and Natural Gamma can be collected logging up and down hole

Temperature Rating: 80 Deg C (176 Deg F)
Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 1.07 m (42.12 in)

3-Arm Caliper = 1.78 m (70.27 in)

Available Arm Sizes: 3", 9", and 15"

FTC (Fluid Temperature/Conductivity) = 0.78 m (30.71 in)

1.57" or 40.0 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	FLORENCE COPPER
Well	R-03
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Final GCFTC Summary

APPENDIX F

Cement Bond Log Summary

WELL R-03

Geophysical Log Summary

COMPANY:	FLORENCE COPPER COMPANY	Logging Engineer:	VARIOUS
FIELD:	FLORENCE COPPER SITE	Date Logged:	VARIOUS
WELL ID:	R-03	Processed By:	K.M / B.C.
COUNTY:	PINAL STATE: ARIZONA	Date Processed:	07-13-18

Southwest Exploration Services, LLC
borehole geophysics & video services

HALEY ALDRICH

R-03 Sonic CBL with Density Summary

Depth
1in:20ft

Nat. Gamma — Cased 1-31-18 — 0 API 400
3-Arm Caliper — Cased 1-31-18 — 0 Inches 10
Comp Density — Cased 1-31-18 — -1 g/cc 3
Compensation — Cased 1-31-18 — -3 g/cc 1

RX1 - VDL (60mm) - Top — Cased 12-08-17 — 100 uSec 1000
RX1 - TT (60mm) - Top — Cased 12-08-17 — 100 uSec 1000
RX1 - VDL (60mm) - Btm — Open 11-17-17 — 100 uSec 1000
RX1 - TT (60mm) - Btm — Open 11-17-17 — 100 uSec 1000
Bond Index — 0 % 100

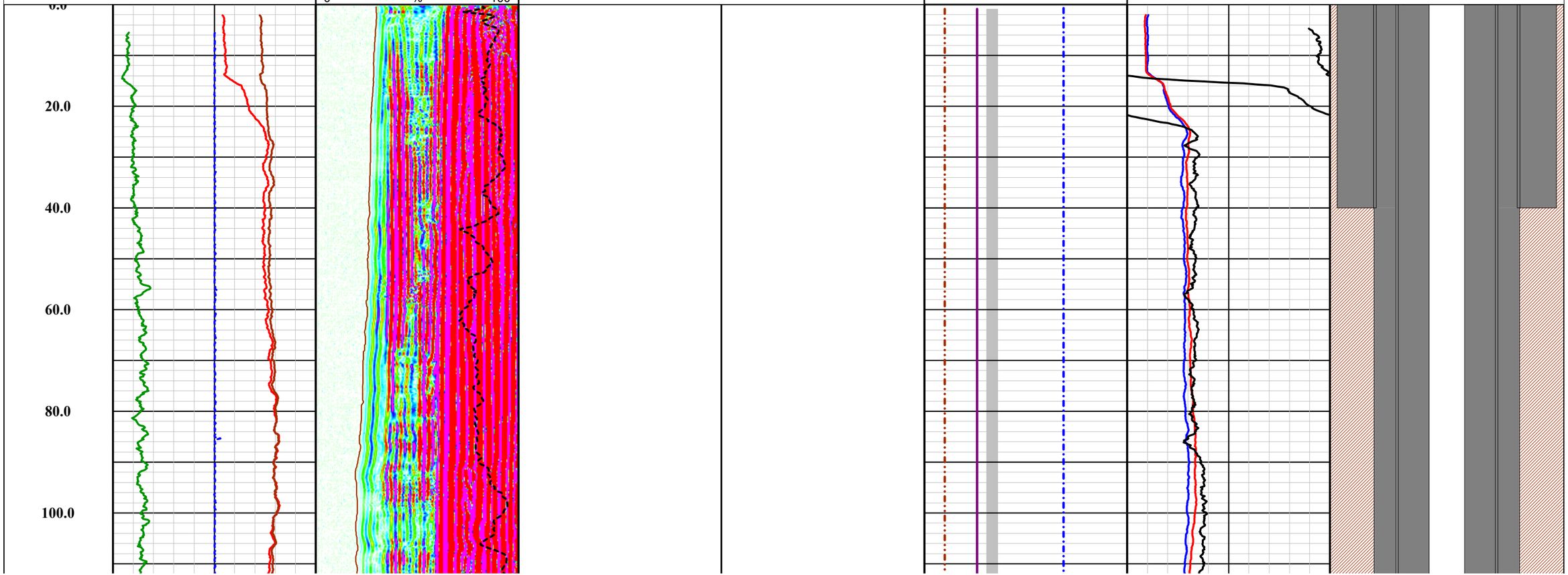
RX1 - VDL — Cased 1-31-18 — 100 uSec 1020
RX1 - TT — Cased 1-31-18 — 100 uSec 1020

RX4 - VDL — Cased 1-31-18 — 100 uSec 1020
RX4 - TT — Cased 1-31-18 — 100 uSec 1020

Velocity Analysis — Cased 3-2-18 — 40 us/ft 220
P-Wave Slow — Cased 3-2-18 — 40 us/ft 220
Steel — 40 us/ft 220
FRP — 40 us/ft 220
PVC — 40 us/ft 220
Cement

Near Density — Cased 1-31-18 — 1 g/cc 4
Far Density — Cased 1-31-18 — 1 g/cc 4
4 Pi Density (Dry) — Cased 1-31-18 — 1200 CPS 900
4 Pi Density (Wet) — Cased 1-31-18 — 300 CPS 0

Well Diagram



120.0

140.0

160.0

180.0

200.0

220.0

240.0

260.0

280.0

300.0

320.0

5" FRP Csg Cemented Inside of 14" OD Steel Csng

340.0

360.0

380.0

400.0

420.0

440.0

460.0

480.0

500.0

520.0

540.0

Neat Cement
Type V

Btm 14" Stl Csng

5.44" OD, 4.74" ID FRP

FRP to PVC Coupler

N60 Sand

560.0

580.0

600.0

620.0

640.0

660.0

680.0

700.0

720.0

740.0

760.0

5.52" OD, 4.77" ID Sch 80 PVC Screen, 0.08" slots

N8/12 Sand

Couplings

5.56" OD, 4.077" ID Sch80 Blank PVC Csng

N60 Sand

N8/12 Sand

780.0

800.0

820.0

840.0

860.0

880.0

900.0

920.0

940.0

960.0

980.0

5.56" OD, 4.077" ID Sch80 Blank PVC Csng

N60 Sand

N8/12 Sand

1000.0

1020.0

1040.0

1060.0

1080.0

1100.0

1120.0

1140.0

1160.0

1180.0

1200.0

N8/12 Sand

Version 9-5-18, RECC

		0 % 100 **Bond Index**					
	-3 g/cc 1 Cased 1-31-18 **Compensation**	100 uSec 1000 Open 11-17-17 **RX1 - TT (60mm) - Btm**			40 us/ft 220 **PVC**	300 CPS 0 Cased 1-31-18 **4 Pi Density (Wet)**	
					40 us/ft 220 **FRP**		
	-1 g/cc 3 Cased 1-31-18 **Comp Density**	100 uSec 1000 Open 11-17-17 **RX1 - VDL (60mm) - Btm**			40 us/ft 220 **Steel**	1200 CPS 900 Cased 1-31-18 **4 Pi Density (Dry)**	
	0 Inches 10 Cased 1-31-18 **3-Arm Caliper**	100 uSec 1000 Cased 12-08-17 **RX1 - TT (60mm) - Top**	100 uSec 1020 Cased 1-31-18 **RX1 - TT**	100 uSec 1020 Cased 1-31-18 **RX4 - TT**	40 us/ft 220 Cased 3-2-18 **P-Wave Slow**	1 g/cc 4 Cased 1-31-18 **Far Density**	
	0 API 400 Cased 1-31-18 **Nat. Gamma**	100 uSec 1000 Cased 12-08-17 **RX1 - VDL (60mm) - Top**	100 uSec 1020 Cased 1-31-18 **RX1 - VDL**	100 uSec 1020 Cased 1-31-18 **RX4 - VDL**	40 us/ft 220 Cased 3-2-18 **Velocity Analysis**	1 g/cc 4 Cased 1-31-18 **Near Density**	**Well Diagram**
1in:20ft **Depth**	**R-03 Sonic CBL with Density Summary**						

APPENDIX G

SAPT Documentation

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
STANDARD ANNULAR PRESSURE TEST

Operator FLORENCE COPPER, INC
Address 1575 W. HUNT HWY
FLORENCE, AZ 85132
Well Name R-03

State Permit No. P-101704
USEPA Permit No. R9UIC-AZ3-FY11-1
Date of Test 4/11/2018
Well Type ENV - RECOVERY - Class III

LOCATION INFORMATION SW Quarter of the NE Quarter of the SW Quarter of Section 28; Range 9E; Township 4S; County PINAL;

Company Representative IAN REAM; Field Inspector LAUREN CANDREVA;

Type of Pressure Gauge Pressure transducer with data logger inch face; 300 psi full scale; 0.001 psi increments;

New Gauge? Yes ☑ No ☐ If no, date of calibration ____ Calibration certification submitted? Yes ☐ No ☑

TEST RESULTS
Readings must be taken at least every 10 minutes for a minimum of 30 minutes for Class II, III and V wells and 60 minutes for Class I wells.
For Class II wells, annulus pressue should be at least 300 psig. For Class I wells, annulus pressure should be the greater of 300 psig or 100 psi above maximum permitted injection pressure.
Original chart recordings must be submitted with this form.

5-year or annual test on time? Yes ☐ No ☑
2-year test for TA'd wells on time? Yes ☐ No ☑
After rework? Yes ☐ No ☑
Newly permitted well? Yes ☑ No ☐

Pressure (in psig)

Time	Annulus	Tubing
12:35	145.70	same
12:45	146.87	same
12:55	147.81	same
13:05	148.78	same

Casing size 5" - NOMINAL
Tubing size 2"
Packer type INFLATABLE PACKER
Packer set @ 3.01(top), 502.33(bottom)
Top of Permitted Injection Zone 462 feet
Is packer 100 ft or less above top of Injection Zone ? Yes ☑ No ☐
If not, please submit a justification.
Fluid return (gal.) 0.39
Comments: Three tests conducted to confirm results - data for all three tests included in attached table and chart

Test Pressures: Max. Allowable Pressure Change: Initial test pressure x 0.05 7.29 psi
Test Period Pressure change 3.08 psi

Test Passed ☑ Test Failed ☐

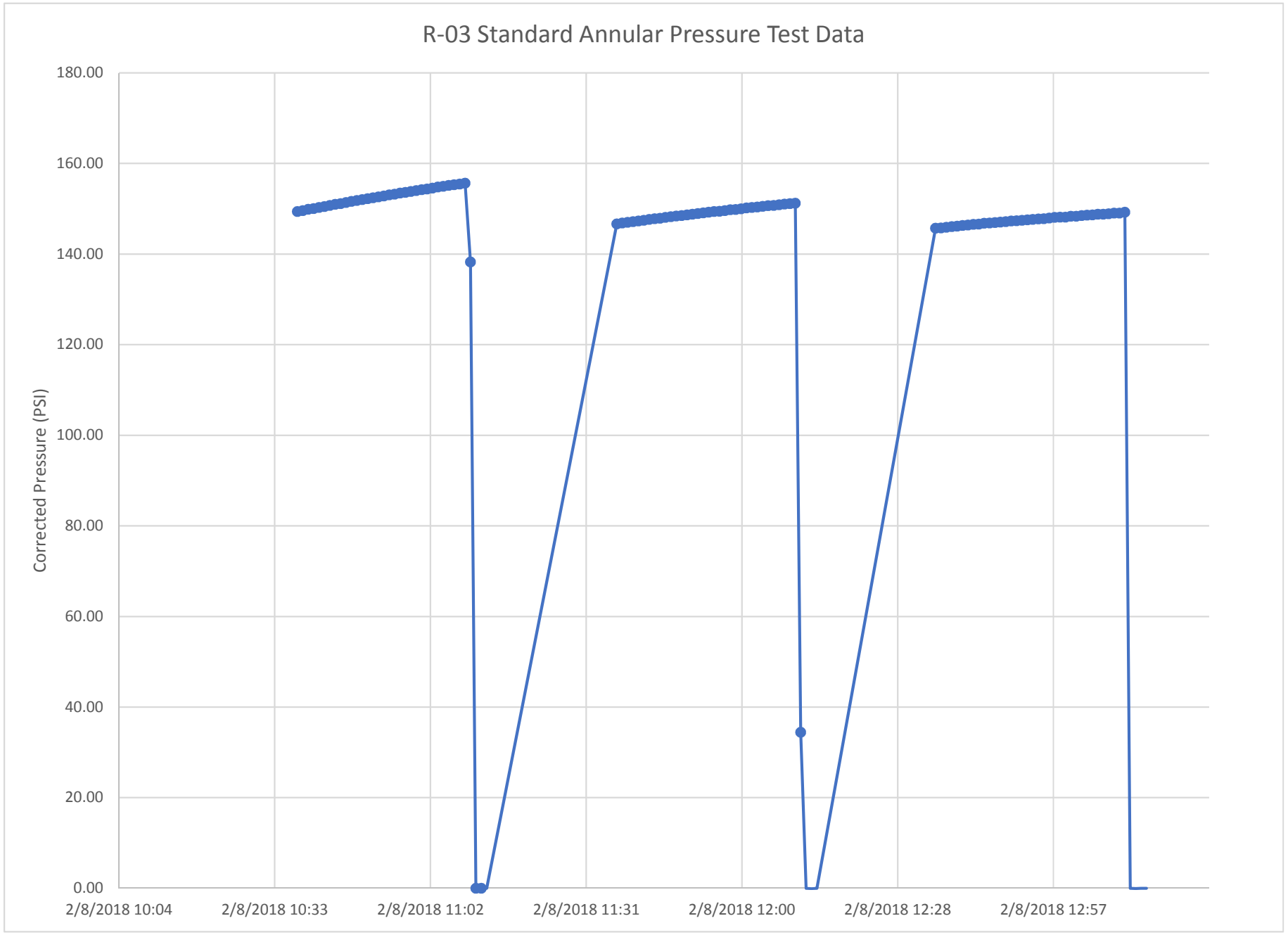
If failed test, well must be shut in, no injection can occur, and USEPA must be contacted within 24 hours. Corrective action needs to occur, the well retested, and written authorization received before injection can recommence.

I certify under penalty of law that this document and all attachments are, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. (See 40 CFR 144.32(d))

Ian Ream
Printed Name of Company Representative

Signature of Company Representative

9-12-2018
Date


R-03 Standard Annular Pressure Test Data
Corrected Pressure (PSI)
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
2/8/2018 10:04
2/8/2018 10:33
2/8/2018 11:02
2/8/2018 11:31
2/8/2018 12:00
2/8/2018 12:28
2/8/2018 12:57

Well R-03 SAPT Data		
Tranducer Serial Number:	554227	
Tranducer Model:	Level TROLL 400 non-vented 300 psi	
Date and Time	Pressure (PSI)	Corrected Presssure (PSI) (Sensor pressure - barometric pressure)
2/8/2018 10:37	163.467	149.40
2/8/2018 10:38	163.667	149.60
2/8/2018 10:39	163.938	149.87
2/8/2018 10:40	164.129	150.06
2/8/2018 10:41	164.351	150.28
2/8/2018 10:42	164.561	150.49
2/8/2018 10:43	164.825	150.76
2/8/2018 10:44	165.058	150.99
2/8/2018 10:45	165.217	151.15
2/8/2018 10:46	165.442	151.37
2/8/2018 10:47	165.675	151.61
2/8/2018 10:48	165.891	151.82
2/8/2018 10:49	166.106	152.04
2/8/2018 10:50	166.293	152.22
2/8/2018 10:51	166.497	152.43
2/8/2018 10:52	166.684	152.61
2/8/2018 10:53	166.89	152.82
2/8/2018 10:54	167.123	153.05
2/8/2018 10:55	167.278	153.21
2/8/2018 10:56	167.538	153.47
2/8/2018 10:57	167.696	153.63
2/8/2018 10:58	167.865	153.80
2/8/2018 10:59	168.094	154.02
2/8/2018 11:00	168.281	154.21
2/8/2018 11:01	168.438	154.37
2/8/2018 11:02	168.611	154.54
2/8/2018 11:03	168.857	154.79
2/8/2018 11:04	169.005	154.94
2/8/2018 11:05	169.205	155.14
2/8/2018 11:06	169.354	155.28
2/8/2018 11:07	169.521	155.45
2/8/2018 11:08	169.743	155.67
2/8/2018 11:09	152.33	138.26
2/8/2018 11:10	14.07	0.00
2/8/2018 11:11	14.074	0.00
2/8/2018 11:12	14.05	-0.02
2/8/2018 11:36	160.748	146.68
2/8/2018 11:37	160.924	146.85
2/8/2018 11:38	161.05	146.98
2/8/2018 11:39	161.204	147.13

Well R-03 SAPT Data		
Tranducer Serial Number:	554227	
Tranducer Model:	Level TROLL 400 non-vented 300 psi	
Date and Time	Pressure (PSI)	Corrected Presssure (PSI) (Sensor pressure - barometric pressure)
2/8/2018 11:40	161.39	147.32
2/8/2018 11:41	161.529	147.46
2/8/2018 11:42	161.695	147.63
2/8/2018 11:43	161.867	147.80
2/8/2018 11:44	161.975	147.91
2/8/2018 11:45	162.169	148.10
2/8/2018 11:46	162.305	148.24
2/8/2018 11:47	162.448	148.38
2/8/2018 11:48	162.586	148.52
2/8/2018 11:49	162.718	148.65
2/8/2018 11:50	162.885	148.82
2/8/2018 11:51	163.014	148.94
2/8/2018 11:52	163.157	149.09
2/8/2018 11:53	163.306	149.24
2/8/2018 11:54	163.434	149.36
2/8/2018 11:55	163.529	149.46
2/8/2018 11:56	163.67	149.60
2/8/2018 11:57	163.832	149.76
2/8/2018 11:58	163.93	149.86
2/8/2018 11:59	164.076	150.01
2/8/2018 12:00	164.232	150.16
2/8/2018 12:01	164.34	150.27
2/8/2018 12:02	164.477	150.41
2/8/2018 12:03	164.598	150.53
2/8/2018 12:04	164.732	150.66
2/8/2018 12:05	164.801	150.73
2/8/2018 12:06	164.97	150.90
2/8/2018 12:07	165.086	151.02
2/8/2018 12:08	165.221	151.15
2/8/2018 12:09	165.32	151.25
2/8/2018 12:10	48.521	34.45
2/8/2018 12:11	14.039	-0.03
2/8/2018 12:12	13.993	-0.08
2/8/2018 12:13	14.064	-0.01
2/8/2018 12:35	159.772	145.70
2/8/2018 12:36	159.854	145.78
2/8/2018 12:37	159.999	145.93
2/8/2018 12:38	160.135	146.07
2/8/2018 12:39	160.246	146.18
2/8/2018 12:40	160.389	146.32

Well R-03 SAPT Data		
Tranducer Serial Number:	554227	
Tranducer Model:	Level TROLL 400 non-vented 300 psi	
Date and Time	Pressure (PSI)	Corrected Presssure (PSI) (Sensor pressure - barometric pressure)
2/8/2018 12:41	160.481	146.41
2/8/2018 12:42	160.618	146.55
2/8/2018 12:43	160.695	146.63
2/8/2018 12:44	160.853	146.78
2/8/2018 12:45	160.942	146.87
2/8/2018 12:46	161.041	146.97
2/8/2018 12:47	161.136	147.07
2/8/2018 12:48	161.229	147.16
2/8/2018 12:49	161.35	147.28
2/8/2018 12:50	161.437	147.37
2/8/2018 12:51	161.499	147.43
2/8/2018 12:52	161.625	147.56
2/8/2018 12:53	161.729	147.66
2/8/2018 12:54	161.813	147.74
2/8/2018 12:55	161.884	147.81
2/8/2018 12:56	162.011	147.94
2/8/2018 12:57	162.153	148.08
2/8/2018 12:58	162.222	148.15
2/8/2018 12:59	162.213	148.14
2/8/2018 13:00	162.401	148.33
2/8/2018 13:01	162.393	148.32
2/8/2018 13:02	162.555	148.49
2/8/2018 13:03	162.677	148.61
2/8/2018 13:04	162.723	148.65
2/8/2018 13:05	162.848	148.78
2/8/2018 13:06	162.885	148.82
2/8/2018 13:07	162.982	148.91
2/8/2018 13:08	163.095	149.03
2/8/2018 13:09	163.099	149.03
2/8/2018 13:10	163.304	149.23
2/8/2018 13:11	14.043	-0.03
2/8/2018 13:12	14.023	-0.05
2/8/2018 13:13	14.05	-0.02
2/8/2018 13:14	14.034	-0.04

APPENDIX H

Well Development Field Forms

PUMPING TEST/DEVELOPMENT
FIELD DATA LOG

Surge Development

Project Name: Florence Copper	Project No.: 129687-007
Well No.: R-03	Date: 4 February 2018
Location: See Plan (East side of PTF Wellfield)	Measuring Point: Pump depth ft bgs. DTW from 1" PVC ~1.2' above TOC
Total Depth of Well (ft bls): 1203	Screen Interval (ft bls): 521-1203
Pump Setting (ft bls): varied. See comments. (begin @ 1160)	Pump Type: Grundfos MS4000 (No. 79353572, SN 00133322)
How Q Measured: Totalizer gauge + stop watch	Personnel: M. Cote

	Time	Discharge (gpm)	Pumping Water Level at start (ft)	Specific Capacity (gpm/ft)	Sand Content (ml/L)	pH	Sp. Cond. ~~(mmhos/cm)~~ µS/cm	Temp. ~~°F~~ °C	Turbidity (NTU)	Comments
Surge #1 intake 1160' bgs	0820	67	231.18	1.55	0.2 ml/L	4.14	1434	23.37	626	Totalizer @ start = 313847 gallons
	0830	67	274.50	~~223.33~~	0	6.66	2121	23.36	265	light brown, passes light.
	0840	67	~~274.80~~	~~448.89~~	↓	7.11	1885	24.00	72.2	Clear w/ suspended solids
	0850	67	275.25	1.26 overall	↓	7.07	1760	23.77	73.3	Totalizer 316249 gallons
Surge #2	0917	67	231.22	—	—	—	—	—	191	Start pump
	0920	68	242.00	—	1.5	7.31	1563	24.62	55.4	clear w/ sand on bottom (settled)
	0930	66	— *	—	0.7	7.31	1526	25.32	24.3	issues w/ water level indicator
	0940	66	274.63	~2.02	0.7	7.29	1473	25.59	36.2	Clear. tr. settled sand.
	0950	61	274.96	~1.47	0.9	7.44	1433	25.52	36.8	Clear. tr. settled sand.
Surge #3	1014	63	232.32	~1.59	1.0	7.38	1395	24.92	~~[illegible]~~	Totalizer @ start 318469 gal.
	1020	61	271.24	~~92.42~~	0.8	7.56	1418	25.52	54.7	Clear tr. settled sand
	1030	61	271.90	~1.56	0.3	7.56	1388	25.14	16.1	Clear tr. settled sand
	1040	61	275.40	~1.44	0.6	7.45	1388	25.80	15.9	Clear tr. settled sand
	1045	62	275.70	~1.43 overall	0.8	7.42	1367	25.80	21.6	Same. Totalizer reads 320484 gal.
Surge #4	1103	62	234.00	—	0.8	7.35	1375	25.86	17.0	Clear w/ trace settled sand
	1110	62	273.97	~1.55	0.5	7.21	1376	26.16	21.8	↓
	1120	62	275.23	~1.50	0.2	7.26	1371	26.01	12.0	↓
	1130	62	275.80	~1.48	<0.1	7.23	1365	26.12	8.09	Clear w/ trace settled sand
	1138	62	276.00	~1.48	0.2	7.17	1362	26.17	10.98	*Stop. Totalizer 322389 gal.
Surge #5	1152	62	235.00	—	0.2	7.14	1347	25.59	17.4	Clear w/ trace settled sand
	1155	61	261.98 ~~261.98~~	~2.30	0.4	7.08	1337	25.69	35.7	Clear, little murky
	1205	61	264.98 ~~261.98~~	~2.03	0.1	6.89	1391	26.28	17.2	Clear. tr. settled sand
	1215	61	275.85	~1.49	<0.1	7.02	1357	26.13	5.11	Clear tr. settled sand
	1222	61	276.24	~1.48	0.1	7.07	1336	25.56	4.61	Clear. Stop. Totalizer = 324220 gal
Surge #6	1245	61	234.76	—	<0.1	7.06	1312	25.26	6.40	Clear w/ trace settled sand
	1250	61	273.78	~1.56	0.1	7.00	1337	26.18	11.0	Clear w/ trace settled sand
	1300	61	275.21	~1.51	0.1	7.03	1349	26.52	7.45	Clear w/ trace settled sand
	1310	61	275.81	~1.48	<0.1	7.04	1362	27.12	3.99	Clear, w/ trace settled sand
End #6	1315	61	276.21	~1.47	<0.1	7.04	1316	25.61	2.78	Totalizer = 326,117 gallons

Additional Comments:
Hach 2100Q Calibration Verified 10 NTU Standard = 10.2 NTU. passed.

PUMPING TEST/DEVELOPMENT
FIELD DATA LOG

Project Name: Florence Copper	Project No.: 129687-007
Well No.: R-03	Date: 4 February 2018 – 5 February 2018
Location: See Plan (East side of PTF Well Field)	Measuring Point: Pump depth ft bgs DTW from 1" PVC.
Total Depth of Well (ft bls): 1203	Screen Interval (ft bls): 521-1203
Pump Setting (ft bls): Varies see comments.	Pump Type: Grundfos MS4000 (No. 79355512, SN00133322)
How Q Measured: totalizer + stopwatch	Personnel: M. Cote

Pump intake ft bgs	Time	Discharge (gpm)	Pumping Water Level (ft)	Specific Capacity (gpm/ft)	Sand Content (ml/L)	pH	Sp. Cond. (~~mmhos/cm~~) µS/cm	Temp. ~~°F~~ °C	Turbidity (NTU)	Comments
										Started Totalizer @ 326,117 gallons
Surge #7	1330	61	235.44	—	<0.1	6.92	1319	26.04	4.78	Clear w/ trace settled sand.
	1340	61	274.64	~1.56	0.1	6.96	1310	25.52	6.64	↓
	1350	61	276.62	~1.52	<0.1	7.00	1321	25.86	4.58	
	1400	61	276.30	1.49	<0.1	7.19	1301	24.98	2.72	↓. Stop Totalizer = 327854 gal.
Surge #8	1425	61	235.00	—	<0.1	7.00	1309	25.87	6.74	Clear trace settled sand
	1435	61	274.75	~1.53	<0.1	7.01	1313	26.11	5.79	↓
	1445	61	275.66	1.50	<0.1	7.01	1308	25.49	4.65	↓
	1455	61	276.20	1.48	<0.1	7.04	1294	25.73	2.61	Totalizer = 329789 gal.
Surge #9	1512	61	235.70	—	<0.1	7.05	1301	26.38	4.38	Clear, tr. settled sand
	1522	61	274.86	~1.56	<0.1	7.00	1275	25.54	4.80	
(17,833 gal.)	1532	61	275.81	~1.50	0.1	6.97	1278	25.36	4.20	Remove 18 lengths @ 801.2' intake
end	1542	61	276.40	~1.52	<0.1	6.99	1277	25.16	2.00	Totalizer 331674 gal.
	1710	65	233.00							Removed 18 lengths to intake 801.2' bgs
Surge #1 intake @ 801.2 ft bgs	1715	67	269.95	~1.79	<0.1	4.25	1243	25.10	34.2	Clear/murky (little)
	1725	64	272.00	~1.68	<0.1	7.15	1262	24.46	14.1	Clear
	1735	64	273.10	~1.60	<0.1	7.02	1231	24.12	25.2	Clear/murky - pauses light well.
	1745	64	273.73	~1.57	<0.1	6.97	1219	23.92	19.4	Totalizer = 334027 gal.
5 Feb. Surge #2	0712	65	230.10	—	<0.1	4.71	1133	20.60	16.2	Totalizer = 334027 gal @ start
	0722	74	268.59	~1.92	<0.1	6.88	1207	21.35	24.5	murky/cloudy.
	0732	72	270.54	~1.78	<0.1	7.20	1250	23.12	7.19	Clear
	0742	73	271.70	~1.75	<0.1	7.31	1224	23.60	4.24	Clear. Totalizer = 335,716 gallons
Surge #3	0805	65	232.78	—	<0.1	7.38	1180	22.23	6.58	Clear
	0815	64	270.69	~1.69	<0.1	7.24	1179	22.03	4.31	Clear
	0825	64	272.44	~1.61	<0.1	7.25	1196	22.44	2.59	Clear
	0835	64	272.69	~1.60	<0.1	7.28	1212	23.05	2.47	Totalizer = 337,001 gallons
Surge #4	0900	66	233.80	—	<0.1	7.34	1179	22.54	3.95	Clear
	0910	63	270.08	~1.74	<0.1	7.32	1200	23.39	3.10	↓
	0920	63	272.69	~1.62	<0.1	7.30	1200	23.50	2.17	↓
	0930	63	273.10	~1.60	<0.1	7.27	1195	23.41	1.45	Totalizer = 339,751 gallons

Additional Comments:

2/5/18 Hach 2100Q calibration verification 10 NTU = 10 NTU passed.

PUMPING TEST/DEVELOPMENT
FIELD DATA LOG

Project Name: Florence Copper	Project No.: 129687-007
Well No.: R-03	Date: 5 February 2018
Location: See Plan (East side of PTF wellfield)	Measuring Point: DTW from 1" PVC Casing (approx 1.2' above TOC)
Total Depth of Well (ft bls): 1203	Screen Interval (ft bls): 521-1203
Pump Setting (ft bls): 498.7 (bottom of intake)	Pump Type: GrundFos
How Q Measured: totalizer + stopwatch	Personnel: M. Cole (MMC)

Time	Discharge (gpm)	Pumping Water Level (ft) ★	Specific Capacity (gpm/ft)	Sand Content (ml/L)	pH	Sp. Cond. ~~(mmhos/cm)~~ µS/cm	Temp. °F °C	Turbidity (NTU)	Comments
								totalizer @ start = 339755 gal.	
Surge #1 1053	68	232.84	—	<0.1	7.15	1197	23.84	26.3	little cloudy.
1105	67	271.15	~1.75	<0.1	7.08	1236	24.21	6.68	clear.
1115	69	272.52	~1.74	<0.1	7.10	1225	25.09	2.38	clear.
1125	67	273.25	~1.66	<0.1	6.83	1248	25.44	2.12	Clear - Totalizer = 341,784
Surge #2 1143	67	234.60	—	<0.1	7.02	1211	24.95	2.89	Clear.
1153	66	272.65	~1.73	<0.1	7.10	1229	25.31	2.76	
1203	65	273.93	~1.65	<0.1	7.06	1229	25.28	1.19	
1213	66	274.47	~1.65	<0.1	7.06	1221	25.39	1.29	Totalizer = 342,868
Surge #3 1228	66	235.76	—	<0.1	7.09	1224	25.37	2.11	Clear.
1238	65	273.54	~1.67	<0.1	7.06	1218	25.35	2.07	
1248	66	274.80	~1.70	<0.1	6.97	1209	24.63	1.22	
1258	65	275.20	~1.65	<0.1	6.93	1198	24.62	1.27	Clear. Totalizer = 345,870
end	Well Development via purge/surge Complete.								

Additional Comments:

PUMPING TEST/DEVELOPMENT
FIELD DATA LOG

Project Name: Florence Copper	Project No.: 129687-007
Well No.: P-03	Date: 4/27/18 (set-up) - 4/29/18
Location: See Plan	Measuring Point: TOC
Total Depth of Well (ft bls): 1203	Screen Interval (ft bls): 521 - 1203
Pump Setting (ft bls): Airlift	Pump Type: Airlift
How Q Measured: -	Personnel: P. Bansal

Time	Discharge (gpm)	Pumping Water Level (ft)	Specific Capacity (gpm/ft)	Sand Content (ml/L)	pH	Sp. Cond. (mmhos/cm)	Temp. °F °C	Comments
4/27/18 1045	Eductor @ 420ft		Airline @ 2	521 ft		Pressure @ 140 psi		start air lifting
1051	-	-	-	2/150	6.63	Not enough sample	14.4	visible particulates, brown/cloudy 0 NTU
1100 STOP airlifting 1230	Eductor @ 614ft		Airline @ 420ft			Pressure @ 170psi		~~307 NTU~~ start air lifting
1245	-	-	-	0.1/325	7.13	947	22.4	307 NTU light brown/cloudy
1315	-	-	-	6 Ø	7.63	922	21.7	123 NTU light brown/cloudy
1330	-	-	-	Ø	7.84	Not enough sample	20.5	60.4 NTU light brown/clear
1337	-	-	-	-	-	-	-	stop air lifting
1517	Eductor @ 808ft		Airline @ 546ft			Pressure @ 170psi		start air lifting
1520	-	-	-	Ø	8.40	1880	22.1	113 NTU light brown/cloudy
1540	-	-	-	Ø	8.27	1877	22.2	53.2 NTU light brown/clear
1600	-	-	-	Ø	8.32	953	23.1	29.0 NTU light brown/clear
1615	-	-	-	Ø	8.33	1746	22.9	19.5 NTU clear
1616	-	-	-	-	-	-	-	stop air lifting
4/28/18 0935	Eductor @ 1003.9ft		Airline @ 546ft			pressure @ 210psi		start air lifting
0840	-	-	-	Ø	6.94	1873	21.8	118 NTU light brown
0900	-	-	-	Ø	7.11	1773	22.4	104 NTU light brown
0915	-	-	-	Ø	7.61	1790	22.9	113 NTU light brown
0935	-	-	-	Ø	7.95	1826	22.3	55.5 NTU light brown
0937	-	-	-	-	-	-	-	stop air lifting
1325	Eductor @ 1086ft		Airline @ 558 ft btoc			Pressure @ 210psi		start air lifting
1330	-	-	-	Ø	8.47	933	22.3	279 NTU brown/clear
1340	-	-	-	trace not settle	8.34	1568	23.0	82 NTU brown/does not pass light
4/29/18 1400	-	-	-	Ø	8.43	955	22.8	188 NTU clear/brown
1435	-	-	-	-	-	-	-	stopped air lifting
0950	-	-	-	-	-	-	-	start air lifting @ ~ 160 psi
0955	-	-	-	Ø	7.01	1796	19.4	108 NTU light brown/clear
1020	-	-	-	Ø	7.19	1849	21.5	321 NTU light brown/clear
1115	-	-	-	-	8.17	1790	~~20.7~~ 23.3	96 NTU start air lifting

Additional Comments:

PUMPING TEST/DEVELOPMENT
FIELD DATA LOG

Project Name: FCI	Project No.: 129687-007
Well No.: R-03	Date: 1/29/18 - 1/30/18
Location: See Plan	Measuring Point: TOC
Total Depth of Well (ft bls): 1203	Screen Interval (ft bls): 521-1203
Pump Setting (ft bls): Airlift	Pump Type: Airlift
How Q Measured: –	Personnel: R. Bansal / D. Mukerjee

Date	Time	Discharge (gpm)	Pumping Water Level (ft)	Specific Capacity (gpm/ft)	Sand Content (ml/L)	pH	Sp. Cond. ~~(mmhos/cm)~~ (µS/cm)	Temp. ~~°F~~ °C	Comments	
1/29/18	1140	–	–	–	–	8.32	1839	24.4	127NTU light brown / clear	
	1230	–	–	–	50	8.36	1808	23.9	OR NTU muddy/dark	
	1300	–	–	–	1.5	8.34	1776	24.5	OR NTU	
	1330	–	–	–	0.5	8.51	1837	23.1	40 NTU	
	1430	–	–	–	100	8.46	1794	24.4	OR NTU	
	1500	–	–	–	100	8.39	1780	24.1	OR NTU	
	1615	–	–	–	40	8.43	1817	25.2	OR NTU Muddy-Brown	
	1645	–	–	–	110	8.47	1782	23.4	OR NTU Sandy-light Brown	
	1700	–	–	–	30	8.51	1792	23.7	OR NTU Light Brown	
	1720	–	–	–	0.5	8.56	1776	23.3	130 NTU Clear	≈ Depth 1145'
	1800	–	–	–	0.3	8.53	1781	23.1	OR NTU Brown	
	1815	–	–	–	0.2	8.51	1790	23.1	OR NTU Brown	start AL
1/30/18	0830	–	–	–	0	8.85	1629	20.6	597 NTU clear/light brown	on COB ≈ 1135'
	0910	–	–	–	30	8.64	1729	22.5	OR NTU Dark brown/Muddy	
	0940	–	–	–	55	8.73	1784	22.3	OR NTU Dark Brown/Muddy	1140'
	1010	–	–	–	0.7	8.59	1766	22.6	510 NTU Light Brown	1145'
	1040	–	–	–	45	8.64	1792	23.1	OR NTU Dark Brown	
	1110	–	–	–	15	8.53	1789	23.1	OR NTU Light Brown	
	1140	–	–	–	70	8.44	1815	23.3	OR NTU Dark Brown	1155'
	1200	–	–	–	40	8.55	836	23.5	OR NTU Brown	
	1225	–	–	–	415	8.47	847	23.3	OR NTU Dark brown, Muddy	1160'
	1300	–	–	–	100	8.45	900	24.6	OR NTU Dark brown, 1"	1163'
	1335	–	–	–	0.3	8.53	1712	24.1	500 NTU Light Brown	1165'
	1420	–	–	–	0.2	8.49	1722	24.5	70 NTU Clear.	1167'
	1445	–	–	–	25	8.59	1799	24.2	OR NTU Dark brown	1169'
	1515	–	–	–	0.5	8.47	1753	24.3	500 NTU light brown.	
	1545	–	–	–	0.2	8.56	1704	24.4	117 NTU Clear.	1170
	1615	–	–	–	2.5	8.55	1686	25.3	162 NTU Light brown	

Additional Comments:

PUMPING TEST/DEVELOPMENT
FIELD DATA LOG

Project Name:	FCI	Project No.:	129687-007
Well No.:	R-03	Date:	1/30/18 - 2/1/18
Location:	See Plan	Measuring Point:	TOC
Total Depth of Well (ft bls):	1203	Screen Interval (ft bls):	521 - 1203
Pump Setting (ft bls):	AIRLIFT	Pump Type:	AIRLIFT
How Q Measured:		Personnel:	D. Mukerjee / P. Bansal

Time	Discharge (gpm)	~~Pumping~~ Water Level ~~(ft)~~	Free Chlorine (mg/L) / Total Chlorine (mg/L) Specific Capacity ~~(gpm/ft)~~	Sand Content (ml/L)	pH	Sp. Cond. ~~(mmhos/cm)~~ (µS/cm)	Temp. °F °C	Comments
1/30/18 1645	—	—	—	0.2	8.43	1733	25.1	416 NTU Cloudy.
1655	—	—	—	15	8.57	1596	24.1	OR NTU Brown
1710	—	—	—	5	8.66	1689	23.6	OR NTU Light brown
1725	—	—	—	5	8.62	1674	23.8	OR NTU "
1740	—	—	—	0.2	8.61	1631	23.9	57 NTU Clear
1815	—	—	—	0.3	8.47	1715	23.2	40 NTU "
1/31/18 0755	—	—	—	—	—	—	—	Start airlifting @ 200psi
0820	—	—	—	0	8.68	908	20.0	214 NTU clear/light brown
0820	—	—	—	15	8.50	1658	21.7	OR NTU muddy brown
0835	—	—	—	—	—	—	21.2	At 1196 ft (final depth)
0840	—	—	—	2	8.58	1681	~~16.8~~ 21.2	52 NTU muddy brown
0855	—	—	—	0	8.58	1337	21.6	36.8 NTU light brown/clear
0905	—	—	—	0	8.58	1667	21.3	274 NTU flaking black specks
0920	—	—	—	0	8.60	1664	21.6	88.8 NTU clear/light brown
0935	—	—	—	0	8	1644	21.6	206 NTU clear/light brown
0940	—	—	—	—	—	—	—	Completed airlifting
2/1/18 ////	/// Injected Chlorine on 1/31/18							////////////
0712	Eductor @ 420 ft		Airline @ 252 ft		Pressure @ 200psi			start airlifting
0717	—	—	—	—	—	—	—	stop airlifting
0730	Eductor @ 420 ft		Airline @ 394 ft		Pressure @ 140psi			start airlifting
—	Running two day to get samples				—	—	—	—
0758	—	—	—	—	—	—	—	Stop airlifting
0911	Eductor @ 614 ft		Airline @ 422 ft		Pressure @			start airlifting
0915	—	0.61	0.36	1.0	13.76	157013	19.2	OR NTU Muddy brown
0930	—	—	—	0	7.44	2724	21.2	155 NTU Light brown
0945	—	—	—	0	8.30	1842	20.8	59.8 NTU Light brown
1000	—	>4.40	>4.40	0	8.53	1757	21.8	37.7 NTU Clear
1015	—	—	—	0	8.37	1730	22.0	28.3 NTU Clear
1020	—	—	—	—	—	—	—	Stopped airlifting

1130
1186
"
"
"
1188

Additional Comments:

PUMPING TEST/DEVELOPMENT
FIELD DATA LOG

Project Name: FCI	Project No.: 129697-007
Well No.: R-03	Date: 2/1/18
Location: see Plan	Measuring Point: TOC
Total Depth of Well (ft bls): 1203	Screen Interval (ft bls): 521-1203
Pump Setting (ft bls): Airlift	Pump Type: Airlift
How Q Measured: —	Personnel: R. Bansal

Time	Discharge (gpm)	~~Pumping Water Level (ft)~~ (Pipe Tally)	~~Specific Capacity (gpm/ft)~~ (Totalizer)	Sand Content (ml/L)	pH	Sp. Cond. (~~mmhos/cm~~ µS/cm)	Temp. ~~°F~~ °C	Comments
2/1/18								
1145	Eductor @ 809ft		Airline @ 546ft		Pressure @	150 psi		start airlifting
1146	—	0.31	0.34	Ø	8.43	1461	25.9	561 NTU brown murky
1200	—	—	—	Ø	8.43	1750	24.8	34.8 NTU clear
1215	—	—	—	Ø	8.39	1695	25.5	18.4 NTU clear
1230	—	>4.40	>4.40	Ø	8.30	1597	25.3	10.2 NTU clear
1245	—	—	—	Ø	8.38	1746	24.9	10.6 NTU clear
1250	—	—	—	—	—	—	—	stopped airlifting
1425	Eductor @ 1003ft		Airline @ 546ft		Pressure @	150 psi		start airlifting
1430	—	0.00	0.00	Ø	8.33	1909	25.2	82.6 NTU clear
1445	—	—	—	Ø	8.31	1708	24.7	23.3 NTU clear
1500	—	—	—	Ø	8.49	1746	24.1	11.5 NTU clear
1515	—	>4.40	>4.40	Ø	8.55	1794	24.3	9.05 NTU clear
1530	—	—	—	Ø	8.52	1831	24.1	10.1 NTU clear
1535	—	—	—	—	—	—	—	stopped airlifting
1703	Eductor @ 1197ft		Airline @ 546ft		Pressure @	180 psi		start airlifting
1705	—	0.09	0.10	Ø	8.47	1896	23.2	66.8 NTU clear
1720	—	—	—	0.5	8.50	1813	23.3	732 NTU muddy brown
1735	—	—	—	Ø	8.58	1789	23.1	97.7 NTU clear
1750	—	0.05	0.04	Ø	8.67	1758	23.3	73.6 NTU clear
1805	—	—	—	Ø	8.63	1743	21.7	533 NTU clear
1806	—	~~0.PRB~~	—	—	—	—	—	stopped airlifting

Additional Comments:

APPENDIX I

Well Video Log and Gyroscopic Survey Reports

Drift Report

Wellbore DRIFT Interpretation

PREPARED ESPECIALLY FOR

FLORENCE COPPER

R-03

Wednesday - February 7, 2018

Southwest Exploration Services, LLC
borehole geophysics and video services

Southwest Exploration Services, LLC
(480) 926-4558

WELLBORE DRIFT INTERPRETATION

Southwest Exploration Services, LLC

(480) 926-4558

Company: FLORENCE COPPER **Well Owner:**

County: PINAL **State:** Arizona **Country:** United States

Well Number: R-03 **Survey Date:** Wednesday - February 7, 2018 **Magnetic Declination:** Declination Correction Not Used

Field: FLORENCE COPPER **Drift Calculation Methodology:** Balanced Tangential Method

Location:

Remarks:

Witness: H & A **Vehicle No.:** 750 **Invoice No.:** **Operator:** A. OLSON **Well Depth:** 1180 Feet **Casing size:** 20 Inches

Tool: Gyro - 186 **Lat.:** **Long.:** **Sec.:** **Twp.:** **Rge.:**

MEASURED DATA			DATA COMPUTATIONS						
DEPTHS, feet	INCLINATIONS, degrees	AZIMUTHS, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEG SEV., degrees per 20 Feet	DOGLEG SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BGR., degrees
0	0.00	000.00	0.00						
20	0.32	241.93	19.99	-0.026	-0.049	1.00	2.01	0.06' (.72")	241.90
40	0.23	256.20	39.98	-0.062	-0.137	0.41	0.29	0.15' (1.80")	245.70
60	0.20	284.65	59.97	-0.063	-0.210	0.96	0.58	0.22' (2.64")	253.30
80	0.20	271.05	79.96	-0.054	-0.279	0.84	0.28	0.28' (3.36")	259.10
100	0.19	257.04	99.96	-0.061	-0.346	0.42	0.29	0.35' (4.20")	260.00
120	0.12	202.87	119.95	-0.088	-0.386	0.13	1.07	0.40' (4.80")	257.20
140	0.09	127.04	139.94	-0.117	-0.382	0.43	1.44	0.40' (4.80")	253.00
160	0.13	065.55	159.93	-0.117	-0.349	0.83	1.20	0.37' (4.44")	251.40
180	0.18	036.58	179.92	-0.082	-0.310	0.95	0.59	0.32' (3.84")	255.10
200	0.20	027.04	199.91	-0.026	-0.275	0.37	0.20	0.28' (3.36")	264.70
220	0.20	021.41	219.90	0.038	-0.246	1.00	0.12	0.25' (3.00")	278.70
240	0.20	005.37	239.89	0.105	-0.230	1.00	0.33	0.25' (3.00")	294.60
260	0.20	025.20	259.88	0.171	-0.212	0.34	0.40	0.27' (3.24")	309.00
280	0.21	022.24	279.87	0.237	-0.183	0.93	0.06	0.30' (3.60")	322.20
300	0.21	019.46	299.86	0.305	-0.157	0.78	0.06	0.34' (4.08")	332.80
320	0.21	012.62	319.85	0.375	-0.137	0.53	0.14	0.40' (4.80")	340.00
340	0.23	357.54	339.84	0.451	-0.131	0.00	0.31	0.47' (5.64")	343.80

True Vertical Depth: 1179.43' **Final Drift Distance:** 2.20' (26.40") **Final Drift Bearing:** 124.80°

Note: Magnetic Declination is not used because it is not a factor in the calculation of well drift or alignment. Magnetic Declination is only important if attempting to hit a target or miss another well and then it is included in the calculations.

WELLBORE DRIFT INTERPRETATION

Southwest Exploration Services, LLC

R-03

(480) 926-4558

MEASURED DATA			DATA COMPUTATIONS						
DEPTHS, feet	INCLINATIONS, degrees	AZIMUTHS, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEG SEV., degrees per 20 Feet	DOGLEG SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BRG., degrees
360	0.23°	355.11°	359.83	0.531	-0.136	0.56	0.05	0.55' (6.60")	345.60
380	0.23°	000.97°	379.82	0.611	-0.139	0.73	0.12	0.63' (7.56")	347.20
400	0.23°	353.87°	399.81	0.691	-0.143	0.88	0.15	0.71' (8.52")	348.30
420	0.23°	353.89°	419.80	0.771	-0.152	0.20	0.00	0.79' (9.48")	348.90
440	0.20°	316.68°	439.79	0.836	-0.180	0.97	0.75	0.86' (10.32")	347.80
460	0.22°	324.32°	459.78	0.893	-0.226	0.96	0.16	0.92' (11.04")	345.80
480	0.14°	274.72°	479.77	0.926	-0.273	0.12	0.98	0.97' (11.64")	343.60
500	0.10°	179.96°	499.76	0.911	-0.297	0.81	1.73	0.96' (11.52")	341.90
520	0.19°	135.61°	519.75	0.870	-0.274	0.59	0.89	0.91' (10.92")	342.50
540	0.29°	056.14°	539.74	0.875	-0.209	0.73	1.50	0.90' (10.80")	346.60
560	0.22°	033.74°	559.73	0.935	-0.146	0.28	0.46	0.95' (11.40")	351.10
580	0.09°	184.81°	579.72	0.951	-0.126	0.77	2.27	0.96' (11.52")	352.50
600	0.28°	137.68°	599.71	0.899	-0.094	0.49	0.94	0.90' (10.80")	354.00
620	0.41°	124.01°	619.70	0.823	-0.002	0.69	0.28	0.82' (9.84")	359.90
640	0.28°	119.45°	639.69	0.759	0.100	0.13	0.09	0.77' (9.24")	007.50
660	0.36°	093.81°	659.68	0.731	0.205	0.83	0.52	0.76' (9.12")	015.70
680	0.39°	103.11°	679.67	0.711	0.334	0.80	0.19	0.79' (9.48")	025.10
700	0.24°	098.23°	699.66	0.690	0.442	0.25	0.10	0.82' (9.84")	032.60
720	0.25°	097.18°	719.65	0.679	0.527	0.54	0.02	0.86' (10.32")	037.80
740	0.25°	106.54°	739.64	0.661	0.612	0.24	0.19	0.90' (10.80")	042.80
760	0.28°	110.12°	759.63	0.632	0.700	0.94	0.07	0.94' (11.28")	047.90
780	0.29°	114.29°	779.62	0.594	0.792	0.65	0.09	0.99' (11.88")	053.10
800	0.33°	144.40°	799.61	0.526	0.872	0.97	0.61	1.02' (12.24")	058.90
820	0.37°	135.27°	819.60	0.433	0.951	0.06	0.19	1.05' (12.60")	065.50
840	0.33°	145.08°	839.59	0.340	1.029	0.29	0.20	1.08' (12.96")	071.70
860	0.32°	140.78°	859.58	0.250	1.097	0.57	0.09	1.13' (13.56")	077.20
880	0.40°	145.03°	879.57	0.150	1.172	0.47	0.09	1.18' (14.16")	082.70
900	0.33°	144.12°	899.56	0.046	1.246	0.42	0.02	1.25' (15.00")	087.90
920	0.37°	136.63°	919.55	-0.048	1.324	0.69	0.15	1.32' (15.84")	092.10
940	0.32°	148.38°	939.54	-0.143	1.398	0.04	0.24	1.40' (16.80")	095.80
960	0.33°	149.32°	959.53	-0.240	1.457	0.30	0.02	1.48' (17.76")	099.40
980	0.33°	150.06°	979.52	-0.339	1.515	0.98	0.02	1.55' (18.60")	102.60
1,000	0.36°	132.46°	999.52	-0.431	1.590	0.95	0.36	1.65' (19.80")	105.20

True Vertical Depth: 1179.43' **Final Drift Distance: 2.20' (26.40")** **Final Drift Bearing: 124.80°**

WELLBORE DRIFT INTERPRETATION

Southwest Exploration Services, LLC

R-03

(480) 926-4558

MEASURED DATA			DATA COMPUTATIONS						
DEPTHS, feet	INCLINATIONS, degrees	AZIMUTHS, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEG SEV., degrees per 20 Feet	DOGLEG SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BRG., degrees
1,020	0.29°	109.74°	1,019.51	-0.491	1.684	0.96	0.46	1.75' (21.00")	106.20
1,040	0.22°	146.09°	1,039.50	-0.540	1.753	0.46	0.73	1.83' (21.96")	107.10
1,060	0.34°	183.27°	1,059.49	-0.631	1.771	0.25	0.75	1.88' (22.56")	109.60
1,080	0.29°	169.71°	1,079.48	-0.740	1.777	0.92	0.28	1.92' (23.04")	112.60
1,100	0.33°	178.06°	1,099.47	-0.847	1.788	0.09	0.17	1.98' (23.76")	115.40
1,120	0.29°	185.83°	1,119.46	-0.955	1.785	0.16	0.16	2.02' (24.24")	118.10
1,140	0.42°	157.17°	1,139.45	-1.073	1.808	0.98	0.58	2.10' (25.20")	120.70
1,160	0.19°	199.12°	1,159.44	-1.172	1.826	0.54	0.84	2.17' (26.04")	122.70
1,180	0.29°	192.34°	1,179.43	-1.253	1.804	0.80	0.14	2.20' (26.40")	124.80

True Vertical Depth: 1179.43' **Final Drift Distance: 2.20' (26.40")** **Final Drift Bearing: 124.80°**

PLANE OF DRIFT VIEW - R-03

FLORENCE COPPER

Drift Distance = 2.20 Feet Drift Bearing = 124.8 Degrees True Vertical Depth = 1179.43 Feet

Date of Survey: Wednesday - February 7, 2018

Balanced Tangential Calculation Method

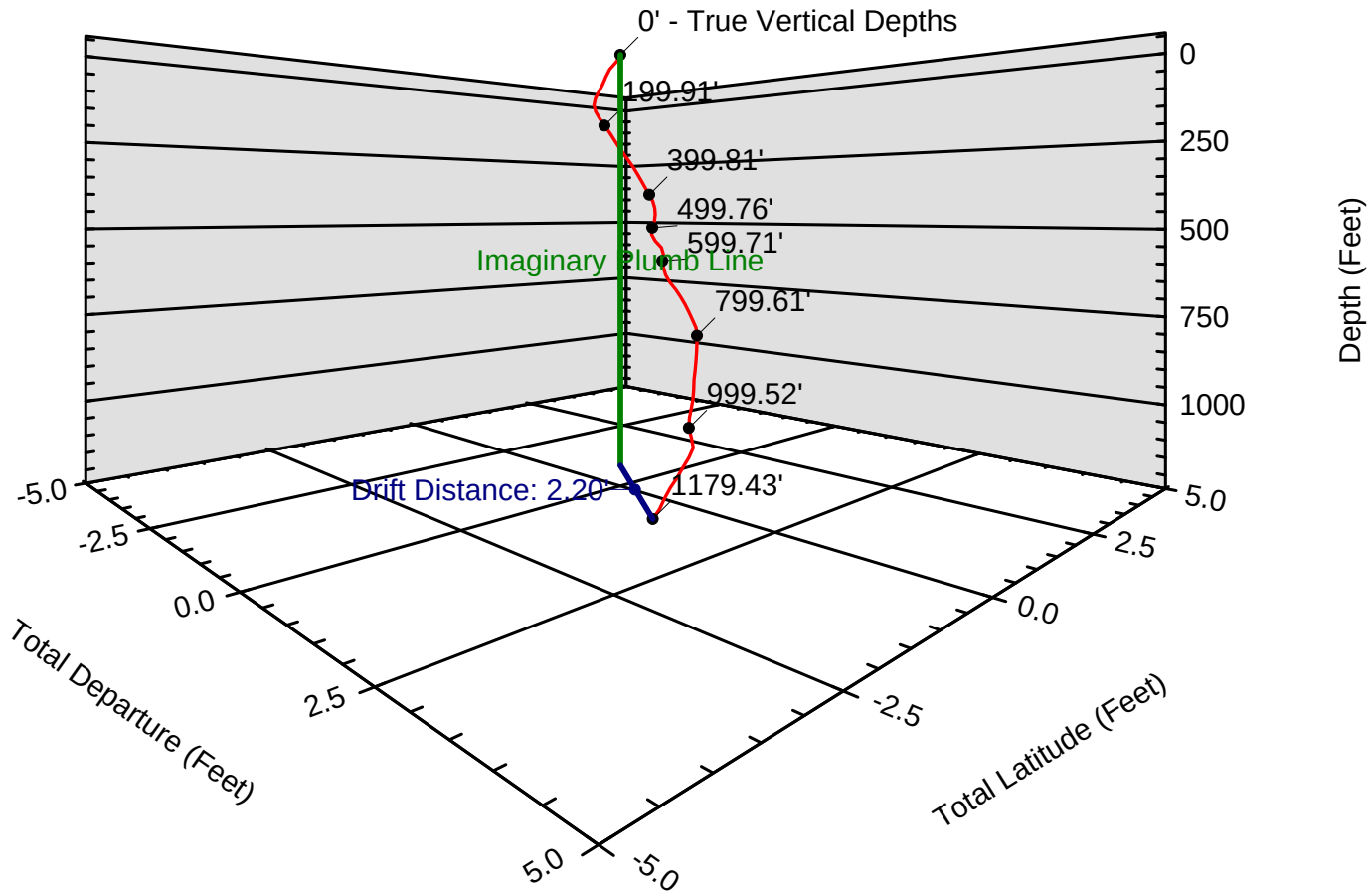
Southwest Exploration Services, LLC (480) 926-4558

3D PROJECTION VIEW - R-03

FLORENCE COPPER

Drift Distance = 2.20 Feet **Drift Bearing = 124.8 Degrees** **True Vertical Depth = 1179.43 Feet**

226.0



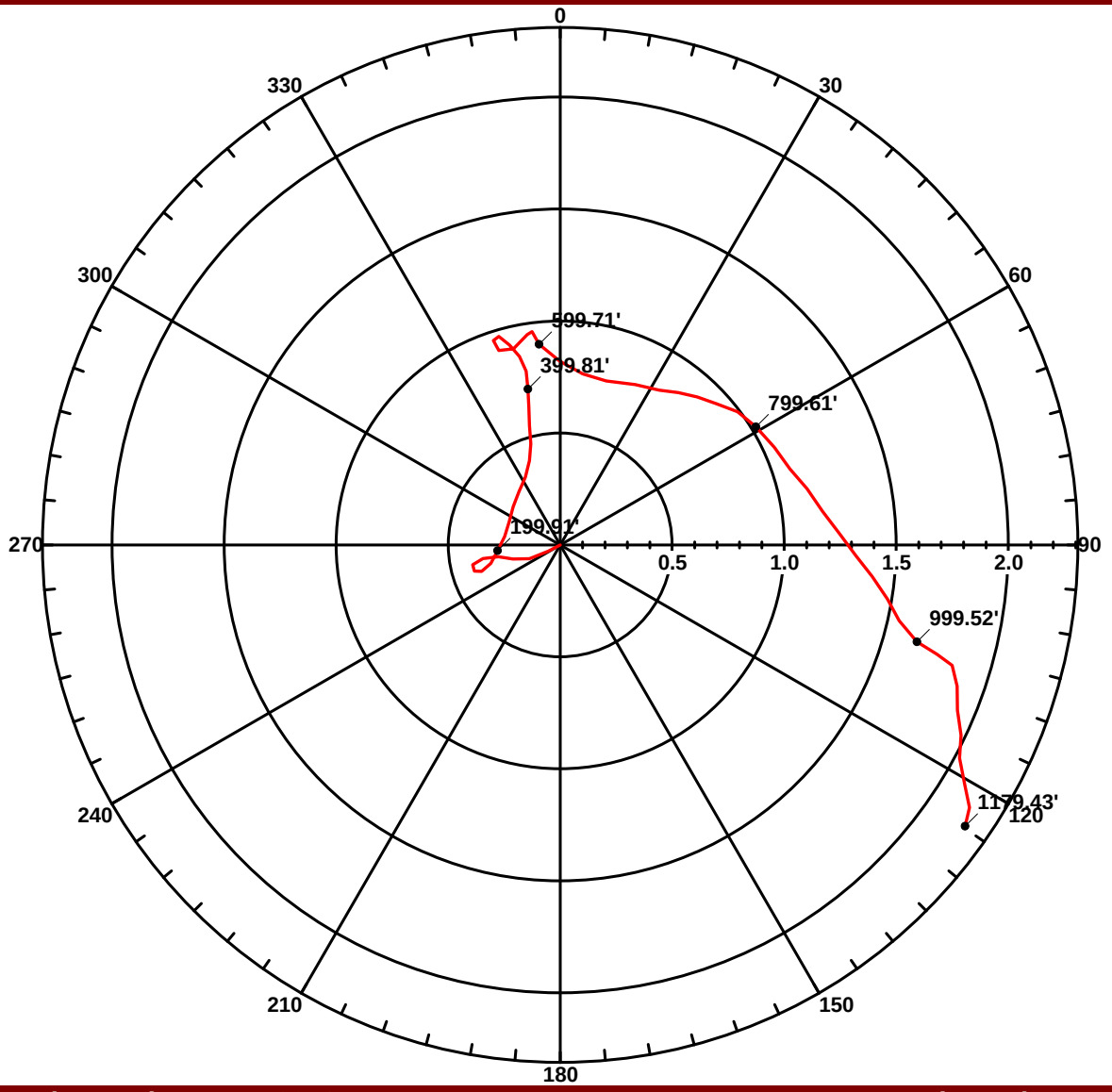
Date of Survey: Wednesday - February 7, 2018 **Balanced Tangential Calculation Method**

Southwest Exploration Services, LLC (480) 926-4558

POLAR VIEW - R-03

FLORENCE COPPER

Drift Distance = 2.20 Feet Drift Bearing = 124.8 Degrees True Vertical Depth = 1179.43 Feet



Date of Survey: Wednesday - February 7, 2018

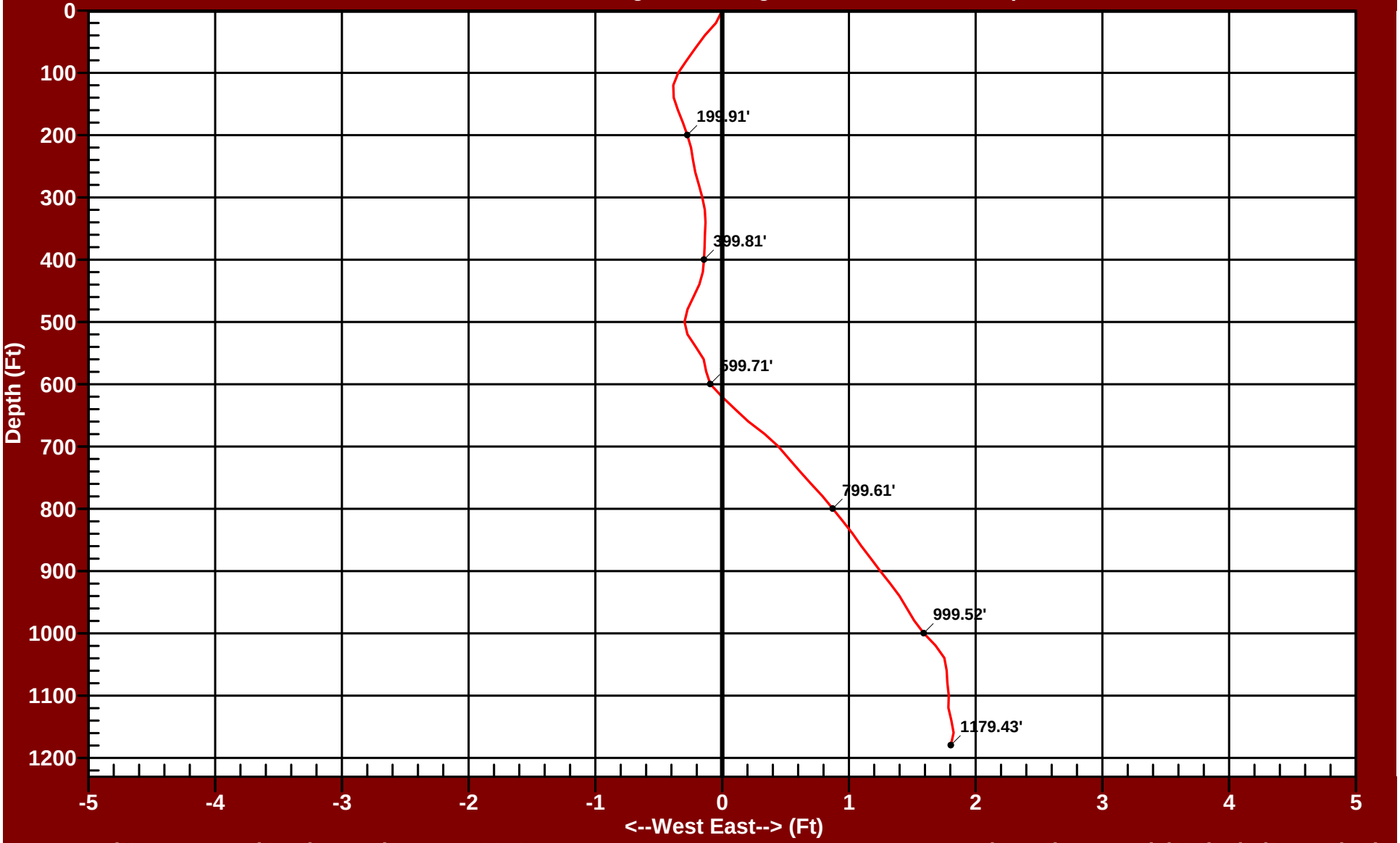
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

EASTING RECTANGULAR VIEW - R-03

FLORENCE COPPER

Drift Distance = 2.20 Feet Drift Bearing = 124.8 Degrees True Vertical Depth = 1179.43 Feet



Date of Survey: Wednesday - February 7, 2018

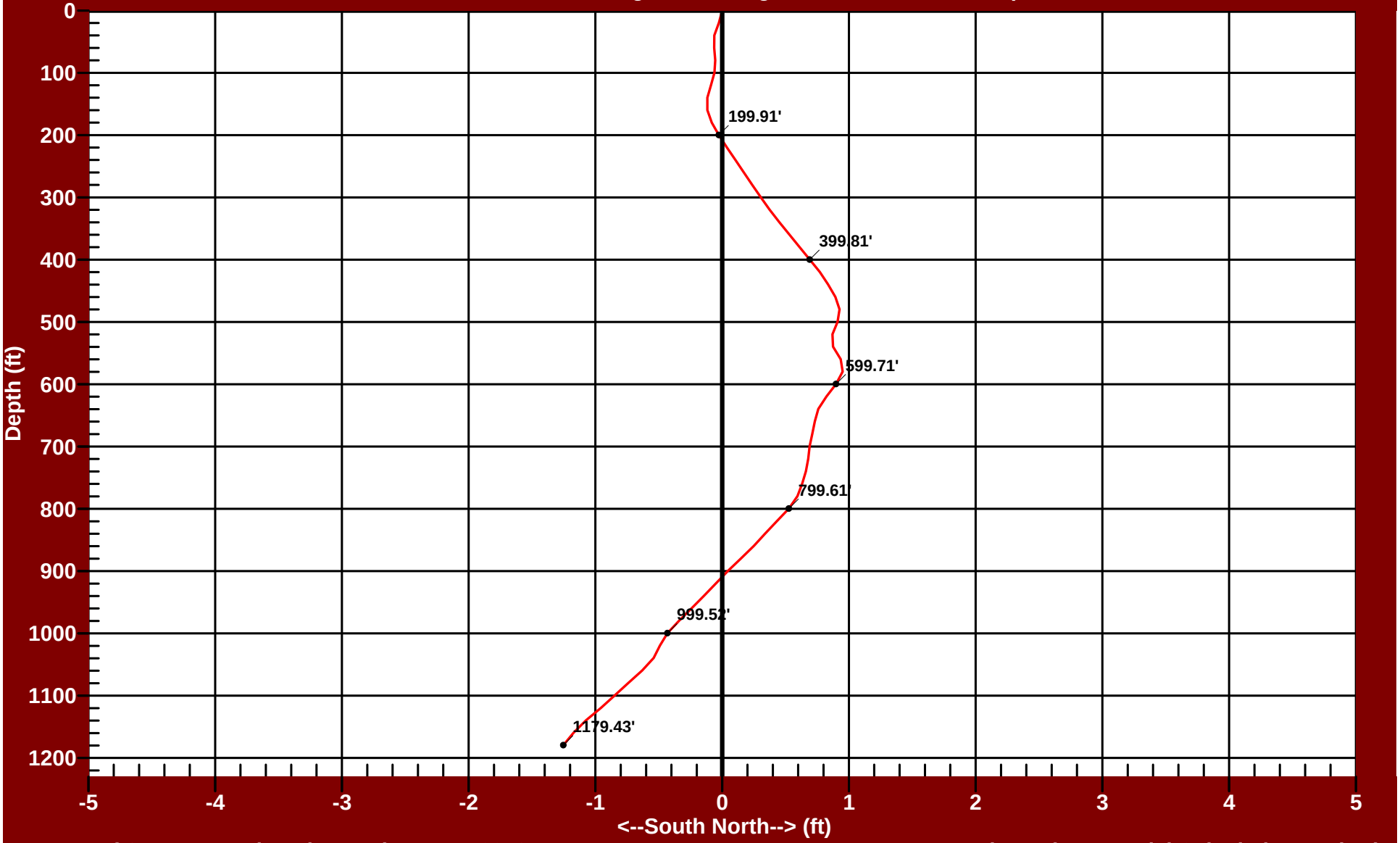
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

NORTHING RECTANGULAR VIEW - R-03

FLORENCE COPPER

Drift Distance = 2.20 Feet Drift Bearing = 124.8 Degrees True Vertical Depth = 1179.43 Feet



Date of Survey: Wednesday - February 7, 2018

Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

Southwest Exploration Services, LLC
borehole geophysics & video services

Southwest Exploration Services, LLC

25811 S. Arizona Avenue Chandler, AZ. 85248

Phone: (480) 926-4558 Fax: (480) 926-4579 Web: www.swexp.com

Client: Florence Copper | Survey Date: February 07, 2018

Address: 1575 West Hunt Hwy | Invoice: 8234 | Run: 1

City: Florence | State: AZ | Zip: 85132 | **Well Name:** R-03

Requested By: Florence Copper | P.O.: | **Well Owner:** Florence Copper

Copy To: | Camera: CCV S.S. Color Camera - Ring of Lights

Purpose: General Inspection | Zero Datum: Top of Casing

Location: | Depth: 1200 ft. | Vehicle: 290

Field: Florence Copper Project | Type Perfs: Horizontal Slots

1st Csg I.D.: 5 In. | Csg Weight: | From: 0 ft. | To: 523 ft. | 2nd Csg I.D.: 5 In. | Csg Weight: | From: 523 ft. | To: 1188 ft.

Standing Water Level: 229.03 ft. | Pumping Water Level: | Pump Depth: | I.D.Ref: Measured | Casing Buildup: Light

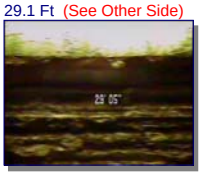
Operator: D. Beam | Lat.: | Long.: | Sec: | Twp: | Rge:

Other Information:

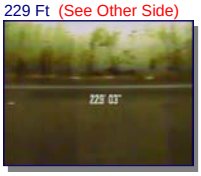
Wellbore Snapshots

0 Ft (See Other Side)

29.1 Ft (See Other Side)



229 Ft (See Other Side)

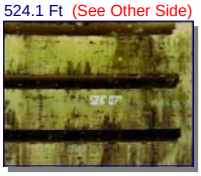


262 Ft (See Other Side)

348 Ft (See Other Side)

523.1 Ft (See Other Side)

524.1 Ft (See Other Side)



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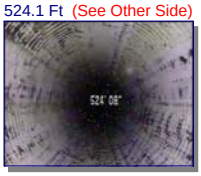
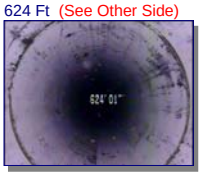


564.1 Ft (See Other Side)

624 Ft (See Other Side)



915 Ft (See Other Side)

1187 Ft (See Other Side)

True Depths: (SideScan-Feet)	WELLBORE / CASING INFORMATION
0.	Survey started the the top of the casing.
29.1	Joint above water leve.
229.	Static water level observed
262.	Joint below water level.
348.	Down view of a joint.
523.1	Transition between fiber glass and pvc.
524.1	First perforations observed.
524.1	Down view of the perforations.
564.1	Joint between the pvc sections.
624.	Blank section observed.
915.	Perforations near bottom of the well.
1,187.	Bottom of the well observed, survey ended.

Notes:

12 WELLBORE SHAPSHOTS

0 Ft (Enlargement)

29.1 Ft (Enlargement)

229 Ft (Enlargement)

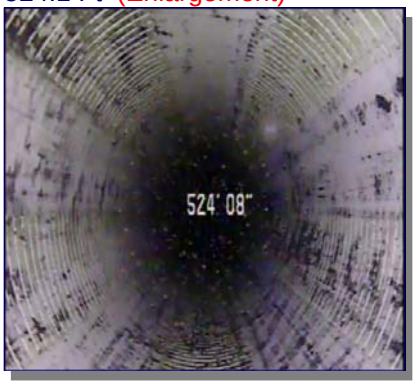
262 Ft (Enlargement)

348 Ft (Enlargement)

523.1 Ft (Enlargement)

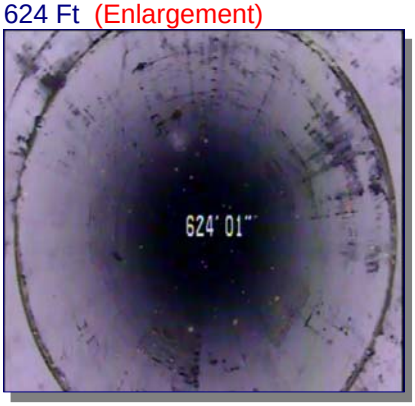
524.1 Ft (Enlargement)

524.1 Ft (Enlargement)

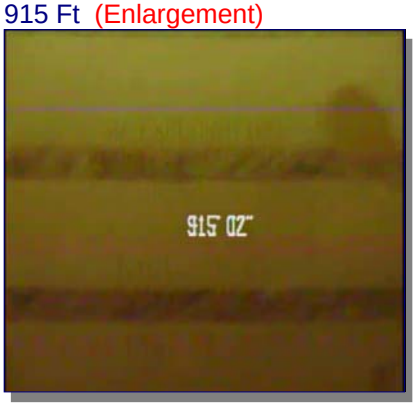


564.1 Ft (Enlargement)

624 Ft (Enlargement)



915 Ft (Enlargement)



1187 Ft (Enlargement)